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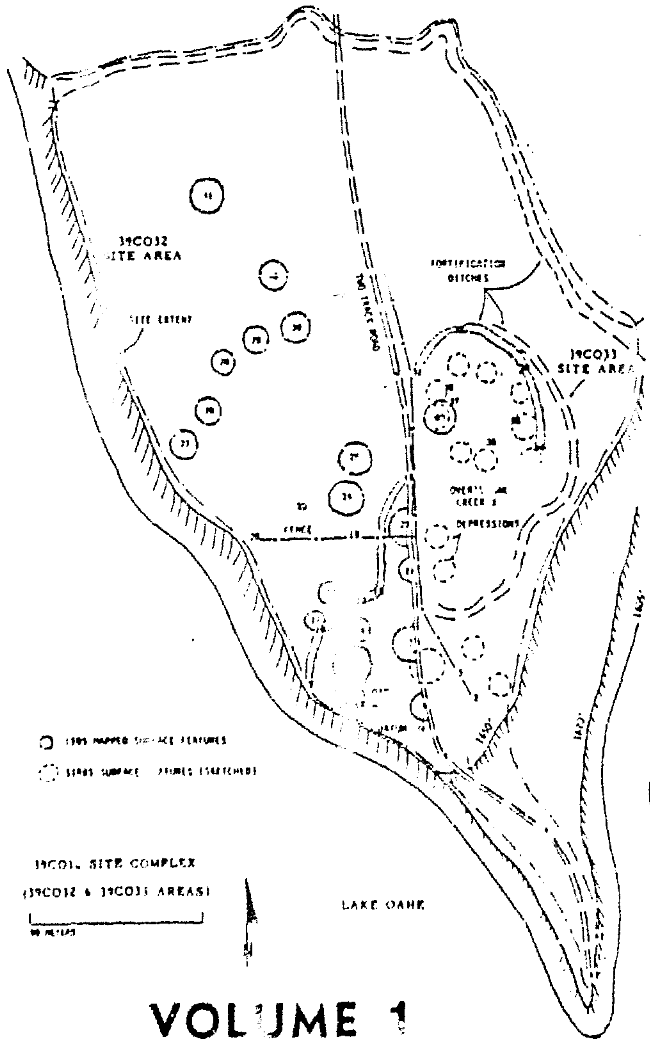
A CULTURAL RESOURCE INVENTORY OF PORTIONS OF LAKE OAHE, CORSON COUNTY, SOUTH DAKOTA



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VOLUME 1

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ABSTRACT

In August and September 1985, personnel from Larson-Tibesar Associates conducted an intensive cultural resource inventory of approximately 22,400 acres along the west bank of Lake Oahe, Corson County, South Dakota for the Corps of Engineers, Omaha District (DACW45-85-C-0223). The project area includes all Lake Oahe Corps land immediately west of Indian Memorial Recreation Area north to the North Dakota-South Dakota border.

The inventory resulted in the relocation of 10 previously recorded sites, 33 new prehistoric sites, 32 new historic sites, and 18 isolated finds. Three of the previously recorded sites (39CO3, 39CO5 and 39CO9) have both historic and prehistoric components. Two of the previously recorded sites, Fort Manuel (39CO5) and Jake White Bull (39CO6) are listed in the National Register of Historic Places. Two sites (39CO3 and 39CO9) are considered eligible, 46 components at 45 sites are considered potentially eligible and 27 sites are not considered to contain sufficient information to be eligible for nomination to the National Register of Historic Places.

Preliminary site patterning analysis yielded a high degree of accuracy in modeling site locations. Lithic resource utilization suggests a similarity in the utilization of Knife River flint for all time periods except for sites associated with the Coalescent Tradition. An investigation of the project area's geomorphology indicates that the first two terraces above the Missouri River (Mt1 and Mt2) have the greatest potential for containing additional in situ buried cultural deposits. The "breaks" topography contains numerous sites but with a lower potential for in situ cultural deposits.

A CULTURAL RESOURCE INVENTORY OF PORTIONS OF LAKE OAHE, CORSON COUNTY, SOUTH DAKOTA

VOLUME 1

by:

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Our archeological investigation of a portion of Lake Oahe in Corson County, South Dakota was aided by numerous individuals. Mr. Charles Murphy, Tribal Chairman, Standing Rock Sioux Tribe, and members of the Real Estate and Law Enforcement offices provided access and valuable information pertinent to our investigation. The people of Mobridge are also thanked for their assistance, particularly Mr. Bill Jay and Mr. Kenneth Zandstra. Mr. Marion Travis was especially helpful concerning the archeology of the area while his collections provided a wider glimpse of the past.

Mr. Robert Alex and Ms. Patricia Hofer of the South Dakota Archaeological Research Center at Fort Meade provided valuable background information for the area and graciously allowed full use of their facilities. Dr. W. Raymond Wood also provided information concerning site 39CO1. Personnel with the U. S. Army Corps of Engineers also provided valuable assistance, especially Mr. Timothy Nowak and Mr. Richard Berg, archeologists and Mr. Stan Jackowitz, Lake Oahe Project Manager.

Additional assistance towards the completion of this report was provided by Mr. John Benko for his computer programming and data entry and Ms. Barbara Wright and Debbie McFaul for typing the manuscript.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

CHAPTER ONE
INTRODUCTION

Paul H. Sanders

In August and September 1985, personnel from Larson-Tibesar Associates conducted an intensive cultural resource inventory of the west bank of Lake Oahe, Corson County, South Dakota for the Corps of Engineers, Omaha District (DACW45-85-C-0223). The project area includes all Lake Oahe Corps land immediately west of Indian Memorial Recreation Area north to the North Dakota-South Dakota border (see Figure 1). This area encompasses approximately 22,400 acres. Legal locations of the project area are summarized in Table 1.

The purpose of the inventory was to meet the Corps of Engineers' obligations and responsibilities under Executive Order 11593. Other legislation and documentation pertinent to this project include the following:

1. Antiquities Act of 1906, 43CFR Part 3.
2. The Reservoir Salvage Act of 1960 as amended by the Archeologic and Historic Preservation Act of 1974.
3. The National Historic Preservation Act of 1966.
4. National Environmental Policy Act of 1969.
5. Executive Order 11593.
6. The American Indian Religious Freedom Act.
7. Archaeological Resources Protection Act of 1979.
8. Implementations Regulations, 36CFR Parts 60, 63, 66, 800 and 32CFR Part 229.
9. South Dakota Guidelines for Cultural Resource Survey Reports.

Personnel for the Lake Oahe inventory included Thomas K. Larson (Principal Investigator), Paul H. Sanders (Project Supervisor), Jeff Kinney (Crew Chief), Kyle Baber, James Dahlberg, John Fisher, Carl Freuden, Pat Persinger, Pat Trader, Kenneth Vander Steen and Mara Wells. Fieldwork started on August 12, 1985 and continued through September 16, 1985. Historic sites were investigated by Paul Sanders and Pat Persinger from May 30, to June 3, 1986. Historical documents search was conducted by Kurt Schweigert, Cultural Resource & Management, Bismarck, North Dakota. Ancillary geoarcheological studies were conducted by Michael L. McFaul, LaRamie Soil Service, Laramie, Wyoming, during August and September, 1985.

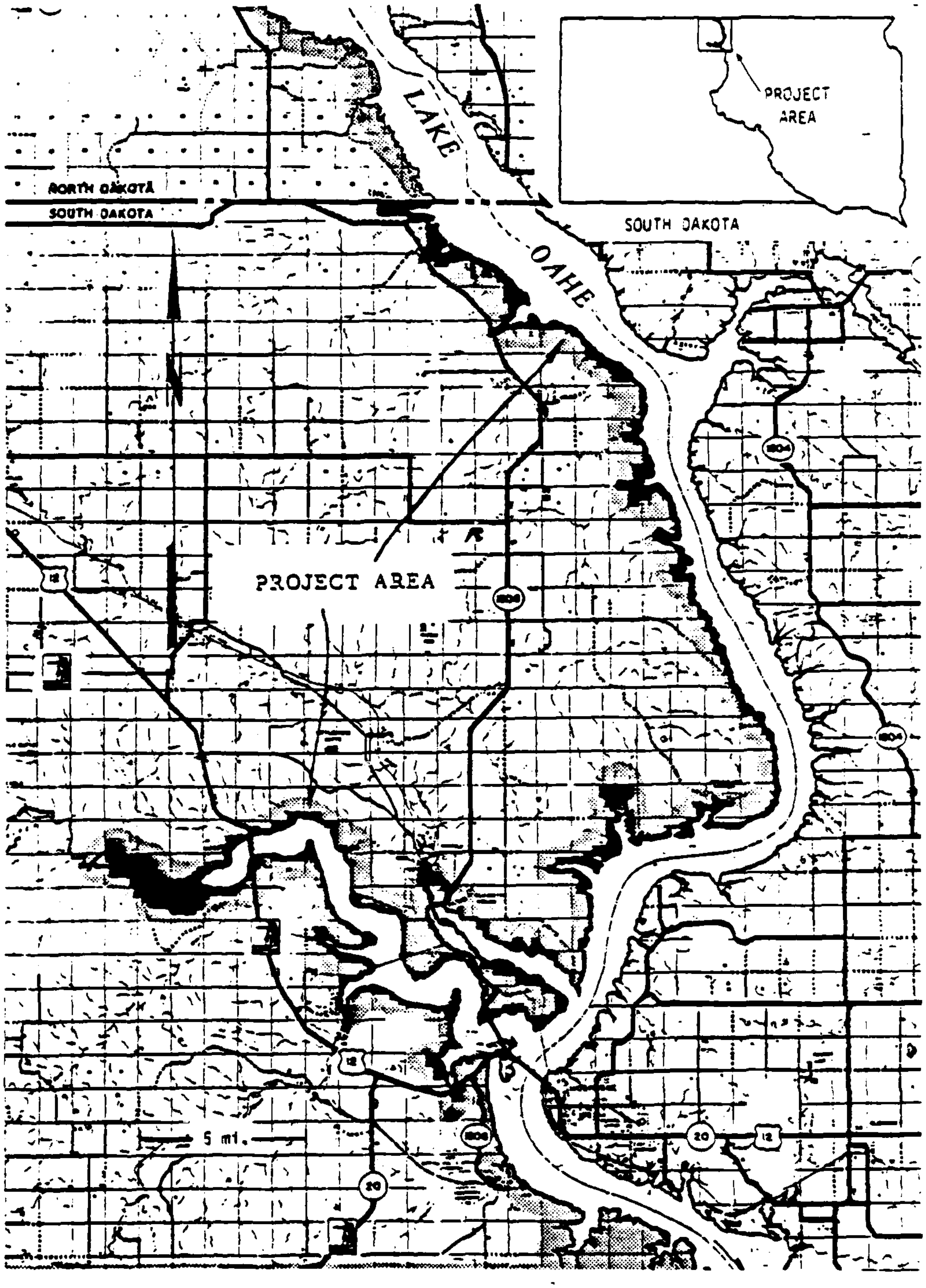

Figure 1. Project area location.

Table 1. Project Area Legal Locations.

Legal Location		U.S.G.S. Topographic Map
T. 18 N. R. 29 E.	S 2	Wakpala SE
T. 19 N. R. 28 E.	S 2-6	Wakpala NW
T. 19 N. R. 29 E.	S 1-27, 29, 34-36	Wakpala and Wakpala SE
T. 19 N. R. 30 E.	S 4, 9, 16-20, 29-30	Mobridge and Mobridge NW
T. 20 N. R. 28 E.	S 25-27, 30-36	Wakpala NW
T. 20 N. R. 29 E.	S 29-32, 34-35	Wakpala
T. 20 N. R. 30 E.	S 21-22, 24-28, 32-34	Mobridge NE and Mobridge NW
T. 20 N. R. 31 E.	S 5-6, 8, 16-17, 19-21, 29-30	Mobridge NE
T. 21 N. R. 30 E.	S 3-4, 10-11, 14-15, 23, 25-26, 36	Kenel, Pollock SE and Mobridge NE
T. 22 N. R. 29 E.	S 1-2, 11-12	Pollock NW
T. 22 N. R. 30 E.	S 6-8, 16-17, 21-22, 27-28, 33-34	Pollock NW and Kenel
T. 23 N. R. 29 E.	S 20-22, 27-28, 33-36	Mahto NE and Pollock NW

Weather conditions during August, 1985 were initially warm and clear which rapidly changed to cool and moist. However only one half day during September, 1985 was lost due to rain. The water level for Lake Oahe averaged 1605 feet and is considered to be low, which uncovered several previously recorded sites. In contrast water levels averaged between 1615 and 1617 during the May-June, 1986 historic site recording. As a result, 5 historic sites that were located during the 1985 field work were unable to be recorded due to inundation.

The inventory resulted in the relocation of 10 previously recorded sites, 33 new prehistoric sites, 32 new historic sites, and 18 isolated finds. Three of the previously recorded sites (39C03, 39C05 and 39C09) have both historic and prehistoric components. Two of the previously recorded sites, Fort Manuel (39C05) and Jake White Bull (39C06) are listed in the National Register of Historic Places. Two sites (39C03 and 39C09) are considered eligible, 46 components at 45 sites are considered potentially eligible and 27 sites are not considered to contain sufficient information to be eligible for nomination to the National Register of Historic Places.

The remainder of this report is segmented into discussions of the environmental setting, previous archeological investigations, cultural history, site descriptions, analyses and results and recommendations. Project area maps, site and isolated find forms and legal locations are provided in Volume 2. Site locations have also been provided on aerial photos and appropriate U.S.G.S. topographic maps to the U. S. Army Corps of Engineers, Omaha District. All collected cultural materials will be curated at the South Dakota Archaeological Research Center at Rapid City, South Dakota. Catalogued items are listed with individual site forms (Volume 2).

Procedures for Documents Search

The two most critical goals in the initial stages of the documents search were to ascertain the number of previously recorded sites in the project area and, as closely as possible, the location of each of these cultural resources. This may seem to be a simple task but, in actuality, it can become very confusing if the proper approach is not taken.

The procedure used in this project was to begin with the descriptions and legal locations as they are provided in the original documentation on the site (e.g., River Basin Surveys site forms; Sigstad and Sigstad 1973; Will and Hecker 1944; etc.) and compare these materials against written and graphic syntheses (e.g., Cooper 1953; Lehmer 1954, 1971; Lehmer and Jones 1968; Adamczyk 1975; Corps of Engineers and Smithsonian Institution map files; etc.). Such preliminary research was found to be very useful in resolving problems such as misplaced site locations, duplicated site numbers and incorrect descriptions of site type.

Preliminary data sources included both published and unpublished materials as well as informant data. Key materials were the published listing and updates of the National Register of Historic Places, reports of the Smithsonian Institution, the reports at the South Dakota Archaeological Research Center in Fort Meade and the State Historical Preservation Center

in Vermillion. Other unpublished reports, manuscripts, notes and maps were also obtained from the Omaha District, Corps of Engineers Office, the Corps Office in Pierre and the South Dakota Archaeological Research Center. The Midwest Archeological Center in Lincoln was also consulted concerning the disposition of certain unpublished manuscripts.

Key informants were Mr. Tim Nowak, South Dakota field archeologist for the Corps of Engineers and Mr. Marion Travis, a concerned and dedicated lay archeologist. Mr. Travis allowed us to view his collection of artifacts, notes, maps and aerial photographs of sites in the project area and surrounding area. He also provided valuable information on the condition of certain sites and at what pool elevation they would be visible. Mr. Travis' information is considered to be most valuable since it is cataloged using Smithsonian site numbers, a procedure which unfortunately is not followed by other local collectors. Dr. W. Raymond Wood was also consulted concerning pertinent information involving 39CO1.

Archival historical research included consultation of published and unpublished sources about the Oahe region. Most pertinent sources were found in the publications and collections of the South Dakota Historical Society in Pierre, which included several unpublished manuscripts and oral history transcripts which may be pertinent to the present study. Local libraries and museums, particularly in Mobridge, were also consulted, the local repositories contained little information not available at the State Historical Society or the South Dakota Archaeological Research Center. Materials concerning Euroamerican and Indian settlement and chain of title searches were obtained from the Public Lands Records maintained by the U. S. Bureau of Land Management in Billings, Montana, Standing Rock Sioux Tribe offices in Fort Yates, North Dakota, and at the Corson County Register of Deeds office at McIntosh. Mr. Dwight Call, Director of the General Convocation of Sioux YMCA's and the office of the YMCA Archives at the University of Minnesota was also contacted concerning site 39CO116.

Materials gathered during the archival research formed the basis of the prehistoric and historical overview. These overviews are intended to provide the Corps of Engineers with a background document for evaluation of historic period resources.

The documents search resulted in the location of 35 previously recorded sites of which 33 are aboriginal and two have both historic and prehistoric components. Locational information of these sites as well as a discussion of their status or relationship to the present project area is presented in Volume 2, Appendix B.

Briefly summarized, the 35 previously recorded sites were found in various conditions ranging from total inundation (i.e., not located), to entirely intact or outside the project area. In a number of cases we were able to determine more specific geographic and legal locations for these sites. These locations are provided in tabular form in Volume 2. Table 2 provides a summary of the previously recorded sites and their current condition or status. Several have multiple site numbers which is the result of being recorded by a number of individuals. Of the 35 previously recorded sites 10 were investigated, 11 were not located and 4 were outside of the project area. Of the eleven sites not located, 8 are believed to have been inundated and three were not found. The latter consist of sites

Table 2. Status of previously recorded sites.

Sites Investigated	Sites Not Found	Sites Outside Project Area
39C01	39C02,40 - Inundated	39C08 - Intact
39C03,53	39C04 - Nothing found	39C037 - Intact
39C05,51	39C011 (Ashley Island - inundated	39C026 - Intact
39C06,41	39C021 - Inundated	39C0209 - (Burials associated with 39C031).
39C07,10,205	39C029,49 - Inundated	
39C09,44 (Only burial area intact)	39C056 - Not found	
39C012, 32, 33	39C057 - Nothing found	
	39C0204 - Nothing found, probably inundated	
39C030,48	39C0207 - Inundated	
39C031	39C0208 - Inundated	
39C035	39C0211 - Inundated	
10 sites	11 sites	4 sites

39CO4, 39CO56 and 39CO57. No cultural materials were observed at these locations but all apparently contain sparse cultural remains and were located in areas of dense vegetation.

In addition, it was previously not known if the two legal locations for Broken Horn Bull village (39CO8 and 39CO37) comprised one village recorded twice or two separate villages. During the course of the present investigation both areas were visited and found to contain intact unfortified villages with circular depressions. Ceramics from 39CO37 are comparable to Extended Coalescent variant La Roche wares. The locations of these two sites are presented in project area maps in Volume 2, Appendix A.

In addition to the previously recorded sites, the historical documents search located 62 structures potentially containing visible archeological remains. Of these 8 were recorded, 1 (L/T 885-5) was found but inundated, 13 were off survey, 34 were in inundated areas and no remains were found at 6 possible locales. Locational information for these localities is presented in Volume 2, Appendix B.

History of Archeological Investigations

The following is a discussion of the previous archeological investigations that have been conducted within the project area based on information derived from the documents search. From the documents search, it is evident that the project area contains rich and varied cultural remains which have been the subject of a long history of archeological investigation involving numerous individuals prominent in the study of the history and prehistory of the Central and North Plains areas. In the history of these investigations, which is summarized below, as well as the extensive surface collections made by local amateurs, the importance of the cultural remains will become evident. Additional details concerning the previously recorded sites are discussed in the individual site descriptions (Chapter Six).

One of the first professional archeological investigations was conducted during the early 1900s by W. H. Over with the University of South Dakota Museum. The sites identified by Over (Sigstad and Sigstad 1973:34-61) occurring within the project area include Demery (39CO1), Kato (39CO2 or 39CO40), Kenel (39CO3), Shooting Bear (39CO4), Fort Manuel (39CO5), Jake White Bull (39CO6 or 39CO41), Lewis and Clark Village or Leavenworth Site (39CO9 or 39CO44), Standing Bear Village or Norvold Village (39CO7, 39CO10 or 39CO205), Ashley Island Village (39CO11), Oak Creek Villages A and B (39CO12), Lookout Village (39CO30) and Broken Horn Bull Village (39CO37). All of these sites are earthlodge villages and many are still visible. Those sites which are presently inundated and assumed destroyed include 39CO2, 39CO9 (village area), 39CO11, 39CO21 and 39CO29. Site 39CO4 was not relocated and 39CO37 is outside of the project area. The remaining sites are discussed in more detail later in this report.

At about the same time that W. H. Over was conducting his investigations, George Bird Grinnell visited the area searching for the locations of early Cheyenne Villages. These locations were based on oral traditions of the Sioux and Cheyenne (Grinnell 1918). Accompanied by Dr. A. McG. Beede of Fort Yates, North Dakota, Grinnell examined the area around St. Benedict's Mission (Old Kenel) in 1918 and located cultural

remains which were probably associated with site 39CO3. This is the only site in the project area purported to be Cheyenne. W. Raymond Wood (1971:54-71) examined some of the cultural remains at this and other "Cheyenne" sites and concluded that the cultural materials fit well within the Plains Village traditions of the Middle Missouri with no evidence to support a Cheyenne affiliation.

During the early 1900s, George F. Will and Thad C. Hecker were also conducting archeological investigations within the project area. Their investigations, summarized in Will and Hecker (1944:85-88), discuss the following sites: Demery (39CO1), unnamed Arikara south of Demery (39CO2), Kenel (39CO3), Shooting Bear (39CO4), Fort Manuel (39CO5), Leavenworth (39CO9) unnamed Arikara (39CO12 or 39CO32 and 39CO33) and the White Bull Site (39CO207). W. Raymond Wood (see Larson et al. 1983:99) notes that Will and Hecker's (1944) study was primarily an inventory of village sites in the region, however it also contained the first taxonomy based on the cultural remains. The majority of the sites, mentioned above, Will and Hecker (1944) accurately attribute to Arikara while 39CO3, 39CO4 and 39CO207 associated with Archaic Mandan.

The presence of numerous burials around Mobridge lead to excavations in 1923 by M. W. Stirling, Assistant Curator of Ethnology, United States National Museum and W. H. Over (Stirling 1924). Waldo Wedel's (1955) later report on these investigations dealt with human and cultural remains excavated from cemeteries near 39CO9, 39CO31 and 39CO32/33 (listed in this report as 39CO12) within the present project area and 39WW1 near Mobridge. Based on the percentage of trade goods, Wedel (1955:180-181) proposed that the above arrangement of sites may be chronologically ranked youngest to oldest.

During the 1930s, William Duncan Strong conducted numerous investigations in the project area and North and South Dakota in general. These investigations, which included excavations at 39CO5 and 39CO9, resulted in his landmark work "From History to Prehistory in the Northern Great Plains" (Strong 1940).

The intensity of archeological investigations increased tremendously as a result of the passage of the Pick-Sloan plan and the construction of massive dams along the Missouri River (Larson et al. 1983:100). Archeological inventories of the project area were conducted from 1946 to 1953 most notably by Paul Cooper, R. C. Farrell, J. J. Hoffman, J. J. Bauxar, R. B. Cumming, and Ray Mattison with the Smithsonian Institution-River Basin Surveys. Within the project area, these inventories basically resulted in the assignment of a Smithsonian trinomial to the sites observed by Over (Sigstad and Sigstad 1973) and Will and Hecker (1944).

The major archeological impact of the River Basin Surveys was the identification of archeological sites in imminent danger of inundation which spurred a program of salvage excavation. Excavations within the project area were conducted at 39CO1 in 1956 by Woolworth and Wood (1964); at 39CO5 by W. R. Wood and Frederick Hadleigh-West in 1956 and in 1965-66 by G. Hubert Smith (Smith and Ludwickson 1983); and at 39CO9 in 1960-62 by Richard Krause (1972) and 1965-66 by William H. Bass (Bass et al. 1971 and Franke n.d.)

The information obtained from these and other investigations led to Donald J. Lehmer's (1971) synthesis of the history and prehistory of the Middle Missouri subarea. Sites which Lehmer (1971) included within his taxonomy include 39CO1, 39CO5, 39CO9, 39CO10 (or 39CO205), 39CO31 and 39CO35 - Extended Coalescent variant; 39CO31 - Post-Contact Coalescent variant; 39CO3 - Extended Middle Missouri variant; 39CO6 - Terminal Middle Missouri variant and 39CO9 - Disorganized Coalescent variant (1971:Figures 39, 77, 79, 82 and 111).

Lehmer's (1971)taxonomic system continues to be used today, however more recent investigations have shown that it is in need of refinement. Salvage excavations conducted at 39CO6, the Jake White Bull site in 1976 by Stanley Ahler with the University of North Dakota obtained numerous charcoal samples which yielded an averaged corrected date of A.D. 1013 ± 43. Ahler (1977a:130) comments that:

> The computed early date of occupation would make the Jake White Bull site the earliest dated site occupied by Extended Middle Missouri people north of the Grand River, and perhaps one of the earliest such occupations in the entire Middle Missouri subarea (cf. Thiessen 1977). Given the existing results, further chronological analysis of the Jake White Bull site is clearly desirable if not mandatory.

As noted above, Lehmer (1971:Figure 79) assigned 39CO6 to the Terminal Middle Missouri variant, which Ahler (1977a:145) states was due to the belief that fortification ditches were a characteristic of Terminal Middle Missouri sites. This example of Jake White Bull as well as Helb across the river (see Falk and Calabrese 1973) point to the importance of radiocarbon dates in the construction of any chronology and is also a primary deficiency of prior investigations.

Except for Ahler's (1977a) study, few investigations have recently been conducted within the project area. The latter have been restricted to brief large-scale summaries (e.g., Jensen 1965 and Adamczyk 1975) or small inventories for boat ramps or irrigation pipelines (Buechler n.d.; Boyd 1978; Nowak 1980 and Owens 1982). The latter inventories did not locate any significant cultural remains.

The adequacy of these previous investigations must be viewed in terms of the context of the specific investigation and their overall goals or intent. The early investigations by W. H. Over (Sigstad and Sigstad 1973) and Will and Hecker (1944) primarily documented the existence of Plains Villages within the project area. The later Smithsonian Institution River Basin Surveys basically spot checked these locations. The major problem with these early investigations is the apparent lack of adequate maps, legal locations and site descriptions which has resulted in assigning different site names and numbers to the same cultural manifestation. This is most evident with several sites at the mouths of Crand River and Oak Creek. Specific discussions of these sites in Chapter Six will exemplify this situation and hopefully resolve some of the confusion over this issue.

From the list of previously recorded sites it is also evident that earthlodge villages, associated cemeteries and historic forts were the primary focus of the investigations by Over (Sigstad and Sigstad 1973),

Will and Hecker (1944) and the Smithsonian Institution River Basin Surveys. As a result, it is not too surprising, that the new sites recorded during the present project area are primarily non-earthlodge village sites. It should also not be surprising that information is quite deficient concerning the function and relationships of these latter sites to the overall prehistory of the Middle Missouri subarea. Information concerning these sites as well as more detailed analyses of the artifact assemblages and chronological relationships of the earthlodge villages has, therefore formed the focus of research questions pertinent to the area (Buechler 1984).

In general, it can be stated that earlier inventories were adequate in their success in locating and identifying large, highly visible sites (i.e., primarily earthlodge villages). However it is also quite evident that these sites represent only a small portion of the prehistoric occupation of the area and that further investigation of these non-earthlodge village sites will be the ones which will round-out our knowledge of the region's prehistory. It should be noted that without the intensive investigations of the earthlodge villages along the Missouri River, it would not have been possible to identify those gaps in our knowledge.

CHAPTER TWO
ENVIRONMENTAL SETTING

Keith H. Dueholm and Paul H. Sanders

Introduction

The project area of this investigation is along the Missouri River Valley and its tributaries and generally includes river terraces, glaciated areas, unglaciated bluffs and hills and river bottoms not inundated by Lake Oahe. Physiographically, this area is within the Great Plains province (Fenneman 1931). Culturally, it is a part of the Middle Missouri subarea (Lehmer 1971) encompassing portions of the Cannonball and Grand-Moreau regions.

Physiography, Geology and Soils

The Missouri Valley is a geologically recent feature. Glaciations during the Pleistocene blocked the eastward flowing rivers causing new channels to become incised within the bedrock (Flint 1955). The present Missouri River Valley was one of the last channels to become incised into the relatively soft underlying Upper Cretaceous-age Pierre Formation shales and Fox Hills Formation sand, silts and clays. The east side of the valley is comprised of gently rolling hills of glacial drift which for the most part cover the underlying bedrock. West of the river unglaciated hills such as Rattlesnake Butte overlook a sequence of terraces, dissected breaks and dendritic permanent and ephemeral drainage valleys. The geoarcheological investigation presented later in this report provides additional details concerning these landforms.

The Missouri Valley ranges between 2-5 miles wide and up to 100 m deep. The former floodplain varied between 1-2.5 miles in width. The tributary valleys vary considerably in width and depth with the Grand River being the largest.

Soils also vary and are dependent upon the underlying bedrock or parent material. Areas with exposed bedrock have characteristically shallow clay-rich soils and minimal vegetation cover. In contrast, extensive loess deposits apparently related to the Oahe Formation (Clayton et al. 1976) are rich in minerals and consequently support dense vegetation. Additional information concerning the soils and vegetation are presented later in this section as well as Chapter Eight.

Climate

This area has been characterized by Bailey (1926) as an Upper Sonoran life zone. The climate is therefore semiarid with a mean annual precipitation of 45.5 cm (17.9 in) with temperatures varying from a low of

-33°F in winter to high of 113°F in summer as recorded at Pierre, South Dakota (see Borchers 1980).

Climatic conditions also vary from year to year. During the summer of 1983, for example, Winham and Lueck (1984) reported temperatures exceeding 100° nearly every day along Lake Francis Case while during the field investigation for the present project the weather was cool and moist. Climatic conditions during the past 10,000 years have also varied considerably. Antevs (1948, 1955) defined three post-glacial climatic periods: the Anathermal (c.a 9,000-7,500 years B.P.), the Altithermal (c.a. 7,500-4,500 years B.P.) and the Medithermal (c.a. 4,500-present). Conditions during the Anathermal are considered to have been warmer and moister than present while the Altithermal was warmer and drier than present. The Medithermal is generally believed to be a climatic period similar to present conditions with occasional fluctuations.

Cultural responses within the Middle Missouri to the Anathermal and Altithermal are not well known due to the paucity of archeological data. More information is available for the latter portion of the Medithermal when the region was occupied by Plain Village groups. Lehmer (1970:117) observed:

> The close correspondence between the dates of certain widespread climatic episodes defined by Reid A. Bryson and others and a sequence of episodes in the history of the native cultures of the Missouri Valley in the Dakotas suggest a close correlation between climatic and cultural changes. The beginning of Bryson's Neo-Atlantic episode, when influxes of moist tropical air produced favorable conditions for corn agriculture, correlates with the first appearance of horticulture villages in South Dakota around A.D. 900. The Pacific I episode, beginning around A.D. 1250, was a time of lowered temperatures and decreased precipitation, and it correlates with a drastic reduction in the extent of the occupation of the area by the village tribes. More favorable conditions during the Pacific I episode, which lasted from about A.D. 1450 to 1550, saw a marked increase in the number and geographic extent of occupied villages. The Neo-Boreal episode was a time of cool summers that began about the middle of the 16th century. Many of the villages occupied between A.D. 1550 and 1675 were small and temporary affairs, which suggest a marginal economy. Moderation of the Neo-Boreal conditions during the first half of the 18th century appears to be reflected in the development of larger and more permanent villages in South Dakota.

More recent variations include the "Dust Bowl" of the 1930s. Cultural responses during this period also saw the movement of peoples to different areas of the United States, indicating that human responses to climate appear to crosscut ethnic boundaries and technological differences.

Fauna

A wide variety of fauna occurs within the thick vegetation of the Missouri River bottoms as well as the neighboring short and tall grass

prairies. Additional species are also known to have occurred within this area from early historic accounts and arcneological excavations.

Species common to the area include white-tailed deer (Odocoileus virginianus, mule deer (O. hemionus), antelope (Antilocapra americana), white-tailed jack rabbits (Lepus townsendii), cottontail rabbits (Sylvilagus floridanus), coyotes (Canis latrans), red foxes (Vulpes vulpes), skunks (Mephitis mephitis) and a wide variety of rodents, birds and reptiles. Additional species are listed in Bailey (1926) whose work in neighboring North Dakota should be applicable to the present project area.

A number of large mammals, such as elk and bison, no longer occur in the area but were observed in vast numbers and utilized by early Euroamerican explorers and the indigenous Native Americans. The most important of these is the bison (Bison bison). The bison formed an integral part of the Native American's subsistence as evidenced by their abundant remains from excavated archeological sites along the Middle Missouri (see e.g., Lehmer 1971). In addition to bison, a number of other species have been obtained from archeological sites. Gilbert (1969:281-282) reports the presence of elk (Cervus canadensis), deer, antelope, dog (Canis spp.), swift fox (Vulpes velox), red fox, badger (Taxidea taxus), raccoon (Procyon lotor), skunk, ferret (Mustela spp.), beaver (Castor canadensis), rabbits, prairie dog (Cynomys ludovicianus), wood rat (Neotoma spp.), Canadian goose (Branta canadensis), mallard (Anas platyrynchos), whooping crane (Grus americana), sandhill crane (Grus canadensis), bald eagle (Haliaetus leucocephalus), golden eagle (Aquila chrysaetos), hawk (Accipiter spp.), prairie chicken (Tympanuchus cupido), raven (Corvus corax), crow (Corvus brachyrynchos) and downy woodpecker (Dendrocopus pubescens) from ten Plains Village and Plains Woodland sites. Bass et al. (1971:106) obtained hawk, eagle and black and grizzly bear claws (Ursus americansus and U. horribilus) from their excavation of the burial areas at the Leavenworth site (39CO9). In addition to some of the species listed above, Ahler's (1977a) excavations at Jake White Bull (39CO6), recovered the remains of gar (Lepisosteus sp.), minnows and carp (Hypobis spp.), white sucker (Catostomus commersoni) and catfish (Ictalurus spp.). While the above list is not exhaustive it does provide evidence of the wide range of species available for utilization by historic and prehistoric occupants of the area.

Vegetation

This region of South Dakota has been characterized by Daubenmire (1978) as the Bouteloua gracilis province, or by Bailey (1976) as the Great Plains Short-grass Prairie province. The adjacent area in North Dakota has been termed Mixed-grass Prairie (Kuchler 1975; Bailey 1980). Elements of the more eastern Tall-grass Prairie exist along moist slopes and in bottomlands by the Missouri River (i.e., the Andropogon scoparius province of Daubenmire 1978). The Northern Floodplain Forest (Populus-Salix-Ulmus) also occurs along the Missouri River (Kuchler 1975).

Within this regional setting ten plant communities have been described for the adjacent area along the Missouri River in North Dakota (Larson 1986), influenced by such factors as topography, aspect, and soil texture and moisture. These communities are probably typical of the present survey

area and follow descriptions summarized from Larson (ed. 1986). Nomenclature follows that of the Great Plains Flora Association (1977).

A Mixed-grass Prairie community occurs on level to rolling uplands, and is the most extensive type in the survey area. Dominant species are midgrasses such as needleandthread (Stipa comata), western wheatgrass (Agropyron smithii), junegrass (Koeleria pyramidata) and others. A lower stratum of shortgrasses or sedges is also normally present, including blue gramma (Bouteloua gracilis) and threadleaf sedge (Carex filifolia). Variations in soil texture affects the relative densities of the grass species (Aandahl 1972, 1982). Numerous forbs are present in Mixed-grass Prairie, but usually in low densities (Hanson and Whitman 1938; Redmann 1975). They include biscuitroot (Lomatium spp.), Plains wild onion (Allium textile) and prairie turnip (Psoralea esculenta) early in the growing season and coneflower (Echinacea angustifolia), purple prairie clover (Petalostemon purpureum), blazing star (Liatris punctata), butterflyweed (Gaura coccinea) and silver scurfpea (Psoralea argophylla) later on.

Infrequent shaley or clay badlands of small areal extent are present in the survey area associated with the Upper Cretaceous Pierre Formation. The sparse vegetative cover of the Badland community consists of numerous species, many of which are not found elsewhere in the area. Grasses include western wheatgrass, saltgrass (Distichlis spicata) and foxtail barley (Hordeum jubatum) and some shrubs include long-leaf sage (Artemisia longifolia) and rabbitbrush (Chrysothamnus nauseosus). Characteristic forbs are silverscale (Atriplex spp.), goosefoot (Chenopodium spp.), seablite (Suaeda depressa) and wild buckwheat (Eriogonum spp.). Many of these are typical plants of saline areas further west.

An Andropogon scoparius community occurs on slopes of river and stream valleys, on steep slopes of upper terraces and on slopes of intermittent drainages. This community most often occurs on south-facing slopes. The community is primarily composed of a high proportion of Tall-grass Prairie species associated with members of the Mixed-grass Prairie. Needleandthread, side-oats gramma (Bouteloua curtipendula) and stonehills muhly (Muhlenbergia cuspidata) are typical mid-grasses, while little bluestem (Andropogon scoparius) is the characteristic tall grass. Other tall grasses such as sandhills bluestem (A. hallii) and sandreed (Calamovilfa longifolia) are prevalent on sandier sites, while big bluestem (A. gerardii) is an important component on lower slopes. Important, and often showy forbs include stiff sunflower (Helianthus rigidus), prairie smoke (Geum triflorum), gaillardia (Gaillardia aristata), coneflowers (Echinacea angustifolia and Ratibida columnifera) and prairie turnip.

The deep, narrow ephemeral stream valleys cut through bedrock terraces and the valley slopes (mostly north-facing) of tributary streams of the Missouri River often have a Hardwood Draw community. It is characterized by open to relatively dense stands of bur oak (Quercus macrocarpa) and other deciduous trees such as green ash (Fraxinus pennsylvanica), box elder (Acer negundo) and American elm (Ulmus americana). A variety of shrubs occur in this community which are normally most abundant along the margins of the community or in more open situations. Some of the typical shrubs are buffaloberry (Shepherdia argentea), currant (Ribes americanum and others), chokecherry (Prunus virginiana), wild plum (P. americana) and juneberry (Amelanchier alnifolia). Woody vines such as wild grape (Vitis

spp.) can also be present. Mesophytic forbs often occur here, including Canada violet (Viola canadensis), false Solomons's seal (Smilacina stellata) and wild strawberry (Fragaria spp.). In many situations this community is adjacent to the Andropogon scoparius Prairie community, and may merge into it where trees are not particularly dense.

The two lowest alluvial terraces within the Missouri River Valley support floodplain forest and numerous other plant communities. While the impoundment of Lake Oahe has eliminated much of these, they are still present in the Grand River Valley at the upper end of the project area.

Several nonforest communities are present on the terraces, often associated with old channels or backwaters of the Missouri River. Sand dunes and sandbars are found adjacent to the river channel, supporting the sparsely vegetated Sand Dune community. It contains scattered sedges (Carex spp.) and horsetails (Equisetum spp.) and may be stabilized by cottonwood (Populus deltoides) saplings, willows (Salix spp.), sandreed, Indian ricegrass (Oryzopsis hymenoides) and lemon scurfpea (Psoralea lanceolata). Wetter areas of dunes and sandbars may also contain semiaquatic plants such as bulrush (Scirpus spp.), rush (Juncus spp.), and marsh cress (Rorippa spp.) and other forbs (Johnson et al. 1976; Keammerer et al. 1975). In North Dakota this community is normally small in individual occurrence, but may range up to 10 hectares in extent (Johnson et al. 1976).

Old channels of the River, and elsewhere in quiet water, contain a Marsh community, mostly in water less than six feet (1.9 meters) deep. It is usually dominated by cattails (Typha spp.) associated with emergent hydrophytes such as bulrush, giant reed (Phragmites australis), reed canarygrass (Phalaris arundinacea) and the forbs water plantain (Alisma spp.) and arrowleaf (Sagittaria spp.) Marshes are relatively frequent and large in extent in the valley.

Marshes merge into a Wet Meadow community on their drier upland side. This is dominated by tall graminoids such as sedges, spikerushes (Eleocharis spp.), reedgrass (Calamagrostis inexpansa), mannagrass (Glyceria spp.), reed canarygrass and prairie cordgrass (Spartina pectinata) which form a dense vegetative cover. Forbs in this community include iris (Iris missouriensis), giant goldenrod (Solidago gigantea), Jerusalem artichoke (Helianthus tuberosus), field mint (Mentha arvensis), docks (Rumex spp.) and wild licorice (Glycyrrhiza lepidota). Wet meadows extend along tributary streams and may also occur in moist, open bottoms of draws in upper terraces.

In water deeper than six feet (1.9 meters) a Lacustrine community of submerged aquatics occurs. Plants such as pondweed (Potamogeton spp.), coontail (Ceratophyllum demersum) and horned pondweed (Zannichellia palustris) form a loosely knit community which may also contain algae, and the floating-leaved aquatic, yellow water lily (Nuphar luteum). Many of these species may also occur in deeper parts of the Marsh community.

The vegetation with the largest extent on the lower two alluvial floodplain terraces is, or was, the floodplain forest. This may be divided into two communities. A Cottonwood Forest community occurs on sandy soil, generally nearer the main channel, on the lower of the two alluvial

terraces. Young forests contain many small cottonwood trees. Older forests have tall, widely spaced trees and contain numerous tall shrubs, saplings and herbs (Johnson et al. 1976). Shrubs include chokecherry, buffaloberry, redosier dogwood (Cornus stolonifera), poison ivy (Rhus radicans) and juneberry. Herbs include field mint, bergamot (Monarda fistulosa) and wild licorice. Older forests may be more open and xeric and contain numerous prairie grasses and forbs (Keammerer et al. 1975). Such a situation may be segregated, if desired, as a savannah-type variant of the Andropogon scoparius Prairie community, but is here considered a part of the Cottonwood Forest. Big bluestem, Jerusalem artichoke, ground cherry (Physalis heterophylla) and giant hyssop (Agastache foeniculaceum) are some typical plants of these open forests.

The higher alluvial floodplain terrace, which usually contains silty or clay soils, supports a Mesic Forest community. A relatively closed overstory canopy is provided by green ash, box elder, American elm and bur oak and thus lacks the tall shrub and sapling layer found in the Cottonwood Forest, although arrowwood (Viburnum lentago) may be locally abundant. Lianas or woody vines are more common than in the preceeding community. These include poison ivy, woodbine (Parthemocissus inserta), foxgrape (Vitis vulpina), bittersweet (Celastrus scandens) and Virgin's bower (Clematis ligusticifolia) (Keammerer et al. 1975; Johnson et al. 1976). Forbs in this community include hog peanut (Amphicarpa bracteata), Indian hemp (Apocynum spp.) and field mint. Perhaps due to the lack of a shrub layer these may attain local abundance.

Most of the plant communities are, or have been, subjected to various grazing intensities with differential effects. For instance, heavy grazing in Mixed-grass Prairie and Andropogon scoparius Prairie tends to decrease the relative importance of mid- or tall-grasses while increasing that of short-grasses or may be a factor in aiding establishment of noxious weeds such as leafy spurge (Euphorbia podperae) (Larson ed. 1986). Moderate grazing, however, may contribute to increased productivity by tall-grasses. In Wet Meadows heavy grazing often promotes the replacement of native grasses by such introduced ones as Kentucky bluegrass (Poa pratensis), quackgrass (Agropyron repens) (Keammerer et al. 1975) or redtop (Agrostis stolonifera). This is the usual situation in the bottoms of draws where cattle become concentrated in a small area resulting in heightened grazing intensity.

Floodplain forests subjected to heavy grazing often display a proliferation of shrubs, especially Wood's rose (Rosa woodsii), buckbrush (Symphoricarpos occidentalis) and the introduced fly honeysuckle (Lonicera tatarica) (Johnson et al. 1976). Such a Brushland Grazing Disclimax community can result from openings created by timber removal. The tangle of shrubs formed by Wood's rose can be nearly impenetrable.

Another influence which probably affects some communities is fire suppression. Natural or Indian set fires were probably important in maintaining the integrity and vitality of the Andropogon scoparius Prairie community. Frequent prairie fires may have also reduced the size of individual Hardwood Draw communities or favored the formation of shrubby scrub oak since bur oak forms stump sprouts if the main trunk is killed by fire. Fire may also have promoted higher densities of shrubs in Hardwood Draws by opening up the canopy.

CHAPTER THREE
PREHISTORIC/PROTOHISTORIC CULTURE HISTORY

Paul H. Sanders and Dori M. Penny

Introduction

The following section is a brief description of the cultural history of the project area and is intended to provide a framework in which previously unrecorded sites can be compared. Since the project area is limited geographically, it is necessary to describe the area's prehistory in terms of a larger, regional scope. Regional overviews which include the present project area are Lehmer (1971), Zimmerman and Stewart (1981), Zimmerman (1985) and Wedel (1961). Figure 2 presents a condensation of salient aspects of these chronologies with major periods discussed below.

Paleoindian Period (ca. 9,500-5,500 years B.C.)

This period contains the earliest documented evidence of human occupation on the Plains. This period is normally defined on the presence of finely-made lanceolate projectile points and extinct Pleistocene fauna. Due to the dominance of butchered remains of mammoth and bison at Paleoindian sites, these peoples have most often been referred to as "big-game hunters". However, it is clear from archeological evidence that this is a misconception. A brief survey of the literature indicates that nearly all Paleoindian sites also contain a wide variety of mammals including deer, sheep, antelope, bison, mammoth, camel, marmot, beaver, rabbit, elk, rodents, reptiles, birds and canids. This situation is evident at numerous sites such as Travis 2 (Ahler et al. 1977) in South Dakota, Colby (Frison 1976), Casper (Frison 1974; Frison et al. 1978), Hanson (Frison and Bradley 1980) and Agate Basin (Frison and Stanford 1982) in Wyoming, Bonfire Shelter in Texas (Dibble and Lorrain 1966), Itasca (Shay 1971) in Minnesota, Cherokee Sewer (Anderson and Shutler 1978) in Iowa and Jurgens (Wheat 1979) and Lindenmeier (Wilmsen 1974) in Colorado. The presence of groundstone implements at some of these sites also suggests a reliance on plant resources and ultimately indicates a more diversified subsistence pattern than is normally depicted (see e.g., Bradley 1981:17). Frison (1978:19-20) attributes this bias about Paleoindian lifeways to site visibility:

> ...which is a major problem faced by the High Plains archeologist. Communal animal kills are of high visibility but provide evidence of only a small segment of the total cultural system. Associated butchering, processing, and camping areas are of high visibility but apparently did not preserve well, at least in the Paleo-Indian period. These activity areas are lacking, for example, from the Colby, Horner, and Casper sites and are present but only in a minimal sense at the Agate Basin and Finley

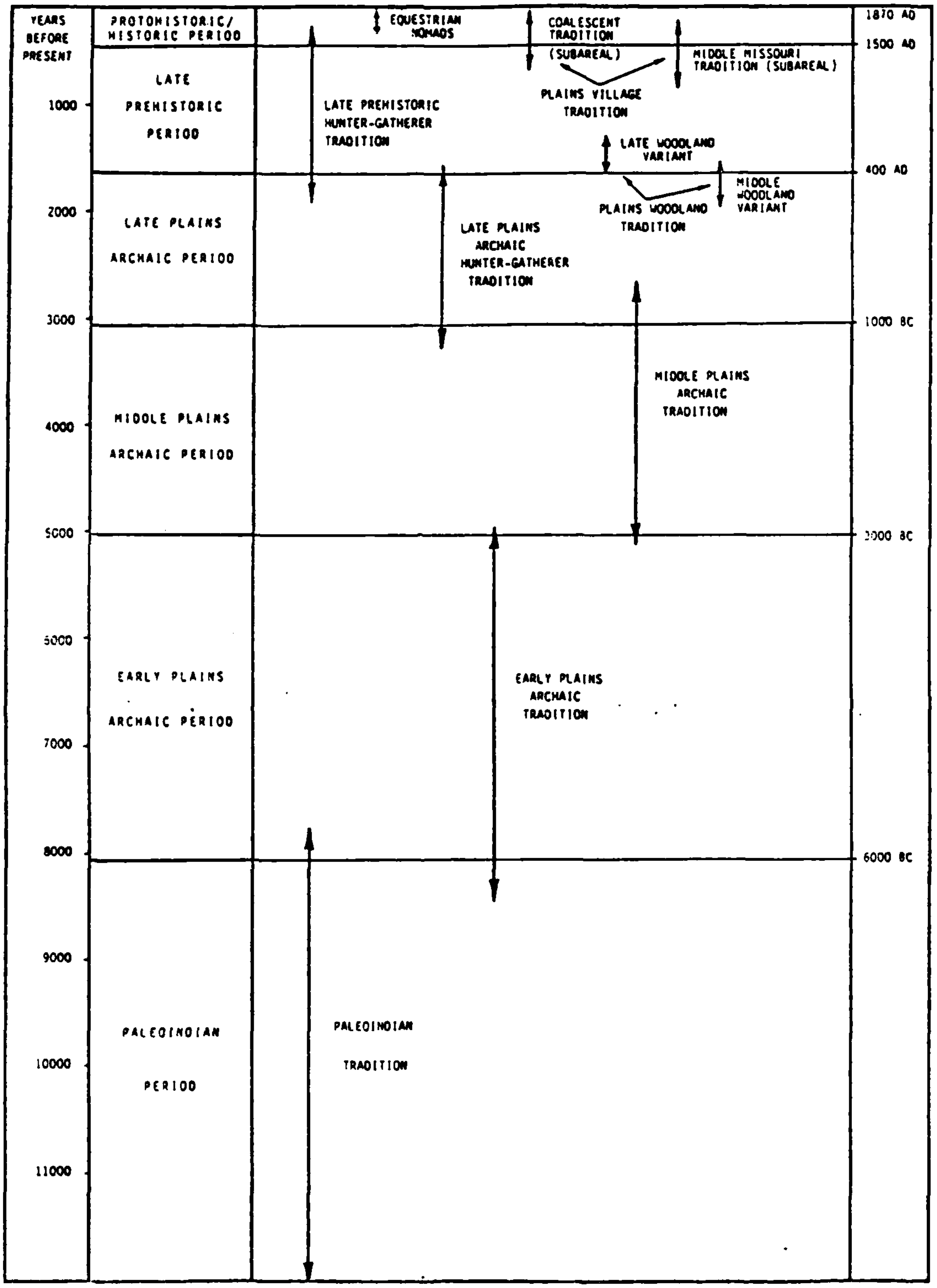

Figure 2. Project area cultural chronology.

> site....Most activities, however, of a small hunting and gathering group were manifestations of activities of snor. duration. Cultural assemblages were small and little was left behind so that most sites are manifest only by small amounts of debitage, simple tools, and possibly a broken projectile point. Rarely is the faunal evidence in such sites preserved.

Site visibility and emphasis of previous archeological investigations on earthlodge village sites have also been cited as the reasons why few Paleoindian or even Plains Archaic periods have been investigated within the Middle Missouri area (see e.g., Henning 1981; Bradley 1981; Larson et al. 1983 or Toom and Artz 1985).

No previously recorded sites within the project area are known to contain Paleoindian age cultural materials, although Paleoindian-age cultural materials have been found south of Mobridge at Travis 2 (Ahler et al. 1977) and Walth Bay (Ahler et al. 1974). Buechler (1984:48) also reports the presence of a Folsom point which was recovered near the confluence of the Grand and Missouri rivers (Travis and Haberman 1983). This indicates that Paleoindian-aged landforms have been preserved within the local area and it seems likely that similar landforms potentially containing Paleoindian period sites should also exist within the project area.

<u>Plains Archaic Period</u> (ca. 6000 B.C. - A.D. 400)

This period is also poorly represented in the project area and most of South Dakota as well. Archeological evidence from areas adjacent to the state, primarily from the Northwestern Plains indicate that prehistoric subsistence continued to be geared towards the utilization of a wide range of food resources. Utilization of plant remains is also inferred from the higher frequency of grinding implements (Frison 1978; Zimmerman 1985).

Buechler (1984), Frison (1978) and others have divided this period into Early, Middle and Late Plains Archaic periods primarily on the basis of stylistic changes in key projectile point types.

A number of sites from the Early Plains Archaic period (ca. 6000-3000 years B.C.) have been recorded from areas immediately to the south of the project area. These include components at Travis 2 (Ahler et al. 1977), Walth Bay (Ahler et al. 1974), and 39WW43 (Winham 1983). The latter site consisted of surface artifacts and a buried bison bone which yielded a radiometric date of 7120 ± 360 years: 5170 B.C. (Winham 1983:71).

The most notable archeological complex occurring during the Middle Plains Archaic period (ca 3000-500 years B.C.) is the McKean Complex. Most of the McKean sites within South Dakota have been found in the western part of the state, especially around the Black Hills, where the initial "type" sites of Mulloy (1954) and Wheeler (n.d.) were found. This complex contains a wide variety of lanceolate to stemmed and notched projectile points which form a discrete archeological manifestation compared to earlier and later period projectile points but nonetheless exhibit a wide range of internal variation. Controversies over the "meaning" of this variation in projectile point types has not yet been resolved (see Mulloy

1954; Wheeler 1952, 1954, and 1985; Tratebas 1981). Todd and Kornfeld (1985:2) have noted that:

> While the questions of differences in projectile point morphology that are at the heart of the McKean typological debates are important, the significance of the confusing array of morphological variability may be that it is symptomatic of broader cultural processes in need of understanding. The difficulties that have arisen over the last three decades of Middle Plains Archaic research may point to lack of fit between interpretative concepts and the nature of the archaeological record.

During the Late Plains Archaic period (ca. 1000 B.C. - A.D. 400), distinctive corner-notched projectile points referred to as Pelican Lake replace the McKean complex variants. Nowak et al. (1982:25.11) note that overall few Pelican Lake sites have been found in South Dakota and have been mainly found in areas around the Black Hills (Haug 1976) and in the northeastern part of the state.

<u>Late Prehistoric Period</u> (ca. A.D. 400-1500)

This period is composed primarily of the Plains Woodland and Plains Village traditions and is marked by the presence of ceramics, various small side and corner-notched projectile points, burial mounds and eventually earthlodge villages. This time period reflects an increase in horticulture, cultural complexity and evidence of an intense utilization of the Middle Missouri subarea.

The Plains Woodland Tradition generally occurred from about A.D. 1 to 900 and is manifested within the present project area by the Sonota Complex (Neuman 1975). The project area is essentially bounded on north and south by a number of Sonota Complex sites composed primarily of burial mounds and associated camp sites. The latter include large quantities of bison bone, lesser quantities of other mammal bones, bone tools, shell, ceramics, various chipped and ground stone tools and large side-notched projectile points commonly referred to as "Besant". Concerning the burial mounds, Lehmer (1971:62) notes:

> While the material culture of the Woodland sites is far less elaborate than that of the later villages, the burial mounds do imply a fairly high development of socioceremonial organization. The Woodland people were obviously able to coordinate the work of the individuals involved in mound building, and to provide food for the workers while they were diverted from their own subsistence activities.
>
> It is my impression that the Woodland cultures of the Middle Missouri were somewhat better adapted to the Plains environment than those of the Central Plains. The relatively high proportion of refuse bone of bison and the frequent occurrence of bison skulls and other bones at the base of burial mounds, in presumably ritual context, suggest that the Middle Missouri Woodland people had developed the techniques of hunting bison on

the uplands far beyond their contemporaries in the Central Plains, who lived chiefly on the deer and smaller game found in the wooded stream valleys.

Reeves (1983) believes that the presence of "Besant" projectile points in the Sonota Complex site is more than coincidental. He suggests that:

> As represented in the Besant Phase it is a nomadic hunting-gathering culture characterized by a distinctive lithic artifact assemblage and in some areas ceramics, burial mounds and occasional habitation structures. Although origins are obscure, evidence suggests that it has been a resident plains tradition on the Northeastern Periphery since possibly 500 B.C....having acquired ceramics, habitations and burial practices through contact with Middle Woodland cultures, expanded physically to the Missouri Basin...(Reeves 1983:185).

The organizational abilities of the "Besant" groups on the Northern Plains is also evidenced by the introduction of artificial structures, commonly called pounds, used to confine or trap bison at the bottom of buffalo jumps (see e.g., Frison 1971, 1978; Reeves 1983).

As noted above, the proximity of the project area to the Sonota Complex sites excavated by Neuman (1975) suggests a high probability of additional sites of this affiliation to occur within the project area.

The Plains Village Tradition occurs from approximately 900 A.D. into historic times (1862). This period is discussed at length by Lehmer (1971) and is divided into the Coalescent Tradition, originating out of the Central Plains and the Middle Missouri Tradition which is thought to have its origins in the eastern woodlands or from an in situ development out of the Plains Woodland Tradition (Lehmer 1971:98; Lass 1981:6-7). Lehmer's (1971) taxonomic system has the Middle Missouri Tradition subdivided into Initial (A.D. 900-1400), Extended (A.D. 1100-1550), and Terminal (A.D. 1550-1675) variants and the Coalescent Tradition composed of Initial (A.D. 1400-1550), Extended (A.D. 1550-1675), Post-Contact (A.D. 1675-1780) and Disorganized (A.D. 1780-1862). Although differences exist between these variants, primarily in terms of ceramics, fortifications, house construction and shape, and trade goods, the variants are similar in subsistence (hunting and horticulture), technology and large village occupations, composed of semisubterranean earthlodges.

Numerous sites at this period occur within the project area. Listed by variant they include Extended Middle Missouri (39CO3 and 39CO6), Extended Coalescent (39CO1, 39CO5, 39CO9, 39CO10, 39CO35), Post-Contact Coalescent (39CO31) and Disorganized Coalescent (39CO9). A number of variants are presently not represented within the project area and include Initial Middle Missouri, Initial Coalescent and Terminal Middle Missouri. This is due to the fact that the first two are confined to central South Dakota while the latter is represented by only a few villages in North Dakota (see Lehmer 1971:Figures 38, 76 and 79). Additional earthlodge villages occur within the project area but have not been adequately investigated and assigned to a particular variant. The significance of these latter unassigned earthlodge villages would obviously increase if they should represent one of the variants presently not known for the area.

Of interest to the prehistory of the area is 39CO1 which is the northernmost expression of the Extended Coalescent (Woolworth and Wood 1964), and 39CO6 one of the earliest Extended Middle Missouri villages (Ahler 1977a).

Protohistoric/Historic Period (ca. A.D. 1500 - 1861)

The Protohistoric period is best represented within the project area by the Post-Contact Coalescent variant which is manifested by the presence of Euroamerican trade goods. Lehmer (1971:136) notes that:

> Ethnology and ethnohistory document some significant distinctions between the three tribal groups in the late 18th and early 19th centuries. The Arikara spoke a Caddoan dialect. The Mandan and Hidatsa languages were both Siouan, but they differed from each other to the point of mutual unintelligibility....
>
> There were other differences in the nonmaterial culture of the 19th-century villagers. These, unfortunately, tend to be only dimly reflected in the materials with which the archeologist has to work. On the basis of the archeological record alone, the uniformities of Post-Contact Coalescent culture are much more apparent than the tribal differences.
>
> The similarities which characterize the cultures of the late village tribes were undoubtedly the product of a convergence of the Middle Missouri Tradition and the earlier manifestations of the Coalescent Tradition. The culture of the historic Mandan and Hidatsa was directly rooted in the Middle Missouri Tradition, but the northern village tribes had lost enough old traits and had added a sufficient number of new ones to place them well within the Coalescent range. Post-Contact Arikara culture was an outgrowth of the Extended Coalescent complex. But there were changes there too, especially in pottery and village plan. Those changes all worked to increase the similarity between 18th-century Arikara and Mandan-Hidatsa cultures.

The only site assigned to this variant is 39CO31 which is located near the confluence of Oak Creek and the Missouri River. The site is a circular fortified village and is illustrated in Lehmer (1971:Figure 5).

This period also saw the rise of the equestrian nomadic groups. Lehmer (1971:164) explains:

> Cultural interactions among the villages of the Missouri Valley in the 18th century were dominated by a new element in the Northern Plains - the horse tribes. The sudden upsurge of the mounted bison hunters created a second power block in the region, which increased in importance year by year.

The trade in Euroamerican goods was central to the relationships between the horse tribes and Middle Missouri villagers. There is ample evidence for prehistoric trade networks (Lehmer 1971:68) and the introduction of Euroamerican trade goods essentially intensified this pattern. Lehmer (1971:166) notes that:

> The early fur trade pattern of fixed posts with a minimal penetration of the interior by Europeans meant that the Indians filled a major role in the operation. Members of some of the interior tribes had to make the long and dangerous journey down to the posts, bringing in cargoes of furs which were worth a fortune by European standards. They took back trade stuffs of fabulous value by Indian standards. Some of these goods were kept for their own use; the rest were passed along to tribes which were not in direct contact with the Europeans. In this way the earliest stage of the fur trade saw the development of groups of Indian middlemen who carried the trade far beyond the range of the European traders themselves.

Although equestrian groups such as the Dakota, Cree and Assiniboin functioned as middlemen between the Euroamericans and Middle Missouri villages. Lehmer notes that the latter were also in a position to profit from this system.

> The advent of European settlers in eastern North American and the Southwest stimulated the older trade patterns enormously, and the Middle Missouri villagers were ideally situated to profit from the increased activity. Trade goods from east and north of the Missouri were in great demand by the tribes to the west and south of the river. Horses and mules obtained by the western tribes from the Spanish ranches in the Southwest were in equally great demand by the eastern groups. The villagers along the Middle Missouri became, in effect, brokers who managed the actual exchanges between the eastern and western tribes with a considerable profit for themselves.
>
> Parties from the west arrived at the villages at intervals, bringing horses and mules and their own products including leather goods, dried meat and pemmican, and flour made from the prairie turnip....The western tribes exchanged their wares for the villagers' garden crops and for guns and other trade goods. The villagers then used the horses and mules, supplemented by their crops, to renew their supply of trade goods through exchanges with the Dakota, Assiniboin, and possibly some Cree and Ojibwa middlemen (Lehmer 1971:169).

Increases in hostilities between the villagers and equestrian groups during this period, combined with devastating epidemics served to reduce the village populations and their power.

> The epidemics of 1837-38 and 1856 resulted from white carriers spreading the infection to the village tribes. Some of the earlier outbreaks may have been due to direct contagion from the Whites, but there seems to be a good possibility of transmission to the village tribes by Indians rather than Whites. Stearn and Stearn (1945, pp. 46-49) cite a passage from Warren's History of the Ojibway in which there is a description of the spread of smallpox to that tribe by a war party which raided a Hidatsa village during the epidemic of 1780-81, and they report that in the same period smallpox killed over 5,000 of the Indians of the Mission Pueblos in New Mexico. The occurrence of

epidemics in the Southwest and the Middle Missouri subarea in the same years raises the possibility of a spread from one area to another. It seems likely that the traffic in horses from the Southwest to the Middle Missouri subarea was the vehicle for transmission (Lehmer 1971:174).

The Disorganized Coalescent variant is the period which Lehmer (1971) proposed that incorporated the decline of the Plains Village period. The Leavenworth site (39CO9) is one of the last villages occupied by the Arikara. The site is comprised of two villages which straddle both sides of an ephemeral drainage, a few miles above the confluence of the Grand and Missouri rivers. Its geographic position allowed the villagers to capitalize on the east-west trade mentioned previously. The importance of this site both historically and archeologically led to extensive excavations of the village (Krause 1972) and associated cemeteries (Bass et al. 1971). The events leading up to the abandonment of this site in 1832 are discussed by Krause (1972:15) below:

> The number of separate village communities diminished rapidly in the early 1800's. At the turn of the century, trouble with the Mandan forced the Arikara in North Dakota to move downriver (Thwaites 1904: I, 204), and by 1804 most of the former North and South Dakota dwelling groups had settled together in three large fortified villages near the Grand River (Abel 1939:124). Lands below the Grand were deserted by 1804 and seem never to have been occupied again. There were several small camps north of the Grand but these may have been hunting parties from the three large southern settlements (Thwaites 1904: I, 187-89; 195-97).
>
> These Grand River settlements became a favorite stopping point for almost all expeditions to the Upper Missouri. A number of Europeans resided in one or another of the three villages but the first to leave a written account of his exploits was Pierre Antoine Tabeau. In 1804 Tabeau (Abel 1939:142) reported the Arikara occupying two villages on the west bank of the Missouri and a third on an island a league below. The Arikara were occupying these three villages late the same year when Lewis and Clark passed them on their way to the Pacific Northwest. All three villages were still inhabited when the explorers returned in 1806 (Thwaites 1904: II, 186-87), but the island village was abandoned sometime before 1811. Evidently its inhabitants moved to the two west-bank settlements which remained. The two west-bank settlements were the residence of an estimated 2,000 Arikara when Brackenridge (1816:11), and Bradbury visited them with the 1811 Astorian expedition.
>
> Twelve years later, the west-bank villages were the site of a battle between the inhabitants and fur traders under the command of General H. L. Ashley. In reprisal for this fight, and for various political reasons, the United States Government sent Col. Henry Leavenworth to punish and subdue the rebellious villagers. In 1823 Leavenworth's 6th regiment, along with a contingent of irregulars from the Missouri Fur Company and 400-500 Dakota Sioux mercenaries, attacked and shelled the villages with little success. As a consequence of the battle, and after several abortive attempts to make peace, the villagers escaped upriver to a point near the Mandan winter villages in North Dakota. The

abandoned Arikara villages were burned, probably by the irregulars from the Missouri Fur Company, althougn they denied responsibility for the act (Robinson 1902:202).

The Arikara remained in North Dakota for a year, then returned to rebuild the Grand River villages. The rebuilt villages were occupied in 1825 when the Arikara signed a peace treaty with the Atkinson-O'Fallon expedition (Reid and Gannon 1929:7-8). They were still occupied when Catlin painted a panorama of them in 1832 (Bushnell 1922), but were soon abandoned. Maximilian (1906:335-36) found them deserted in the spring of 1833.

As the Plains Village groups became displaced, the Missouri River Valley was occupied by various representatives of the Horse Tribes. Howard's (1976) discussion of the John Bear Winter count places a number of Yanktonai encampments along the Missouri River including one on the lower Grand River in 1724 (1976:28). Zimmerman (1985:127) suggests that the occurrences of stone circle sites may also be indicative of these occupations. There is also evidence that some bands of the Sioux and other tribes may have occupied abandoned Plains Village earthlodges or built their own. Alfred Vaughn (1855:72) for example, noted that:

> About 100 miles above Fort Pierre I found erected twelve lodges of the Yanktonais, built with dirt, after the manner of the Arikarees and Mandans, and they are tilling the soil in the same manner of those bands. I am sorry to say that the great drought in that region of their country was such that all kinds of vegetation presented but a very languishing appearance. This is the first attempt of this band to form a permanent village and cultivate the soil....

The location of this small village described above would place it in the general vicinity of the project area. The establishment of the Great Sioux Reservation and later Standing Rock Reservation witnessed an increased occupation of the project area as represented by the numerous historic sites recorded during the 1985 inventory. Additional information concerning the events of this period are provided in the following chapter.

CHAPTER FOUR
HISTORIC OVERVIEW

Kurt P. Schweigert

The Fur Trade and Exploration

Louis XV, King of France and Canada, granted Pierre Gaultier de Varennes Sieur de la Verendrye permission to seek a route from the Great Lakes to the Pacific Ocean in 1731. La Verendrye was to undertake the expedition at his own expense and in exchange he would receive a monopoly of any fur trade the expedition might develop. Montreal merchants, eager for a part of that fur trade monopoly, offered financial support. Trading posts and forts were established from Lake Superior to Lake of the Woods, Lake Winnipeg, and the Red and Assiniboine Rivers (Burpee 1927).

In 1738 La Verendrye built Fort la Reine on an established trade route over which Assiniboine and Missouri Valley tribes went north to trade with the Crees. At the fort, La Verendrye heard a Cree tale of a light-skinned tribe of Indians who lived on a westward flowing river. La Verendrye left Fort la Reine with his two sons and twenty men. Although his route is not certain, they eventually reached the Mandan villages. There is some argument as to the exact location of those villages, and there is no archeological evidence to either prove or disprove it, but it is generally assumed they were near the site of present Bismarck, North Dakota (Burpee 1927:312; Reid 1965; Robinson 1966:28-32).

The river discovered by La Verendrye did not flow westward and the people were not light-skinned as he had been told but La Verendrye's expedition opened the middle and upper Missouri River to the French fur trade originating in Montreal. In 1742 La Verendrye sent two of his sons on a second expedition to the Mandan villages and far to the southwest. The route of this expedition is not definitely known, but an inscribed lead plate found near Pierre in 1913 indicates the expedition may have passed through the study area.

French Canadians dominated the fur trade of the region for half a century after the expeditions of La Verendrye. The Missouri River drainage was part of the French-owned territory of Louisiana and therefore the Montreal and St. Louis traders had legal right to trade in the study region. Access to the region from Montreal was through territories claimed by England, however. In 1670, the English Crown granted exclusive trade and governmental rights for the Hudson Bay drainage to the Hudson's Bay Company which established a post at York Factory about 1672. This began a fierce competition between British and French traders that was only partially resolved when Canada was ceded to England by France in 1763. The cession eliminated the Montreal monopoly of the trade for former French subjects and a period of violent competition between the Hudson's Bay Company and the independent traders began.

At the Peace of Paris in 1763, France ceded Louisiana to Spain. By that date the French had explored and mapped the Missouri from its mouth to the mouth of the Platte River. The Missouri had also been explored from the north as far south as the Cheyenne River. In 1790, Jacques D'Eglise claimed to have reached the Mandan villages from St. Louis. In 1793, he mounted another expedition but it failed due to problems with hostile Sioux and Arikara.

The Spanish, alarmed by British encroachment into their territory of Louisiana, saw the Missouri Company organized in St. Louis to pursue the Spanish trade and quell the British influence on the Upper Missouri River. The Missouri Company built a trading post opposite and slightly above present Fort Randall on November 11, 1795. James MacKay, Scotch by birth but a naturalized Spaniard, moved up the Missouri in 1796 and took possession of the North West Company post at the Knife River villages in the name of Spain. The post, built in 1790 by Rene Jusseaume, proved too remote and the British too entrenched for the Spanish claim to be maintained (Nasatir 1952:77, 81-82, 86, 88, 95, 96, 101; Robinson 1966:36-38).

Other attempts to open trade in the general region followed. Loisell's Post was built about 1800 on an island about 35 miles below present Fort Pierre by Clamorgan, Loisell and Company of St. Louis. This post was also referred to as Cedar Fort and Fort aux Cedres, a name which was also applied to at least two other posts on the Middle Missouri. Loisell's Post was a regular stopping place for traders until it was destroyed by fire in 1810 (Chittenden 1954:954; Schell 1968:36).

On February 23, 1801, President Thomas Jefferson of the United States initiated a correspondence with his friend Captain Meriwether Lewis regarding an expedition to the western country, which at that time was once again French property. The correspondence, which involved a number of others including the Spanish Minister to the United State, proposed an ostensibly scientific and geographical exploration. The letters leave no doubt, however, that non-American possession of Louisiana was of paramount concern and that the United States most definitely wanted access to the Port of New Orleans and a share of the trade in the Mississippi Valley. The end result of this correspondence was the Lewis and Clark Expedition.

By a series of fortuitous circumstances the United States found itself in legal possession of Louisiana shortly before the expedition actually got under way. That somewhat changed the purpose of the expedition. Now Lewis and Clark found themselves ambassadors to the new United States citizens residing in Louisiana Territory (Eide 1969:1-8).

The Lewis and Clark expedition assembled and wintered near the mouth of Wood River, Illinois, across the Mississippi from the confluence with the Missouri. At 4:00 p.m., Monday, May 14, 1804 the expedition began its journey up the Missouri. On October 7, they reached and camped for the night at a point near the present site of Mobridge, about four and a half miles below the mouth of Grand River. On October 8, the company passed the first Arikara village and a small trading post called Tabeau's Post. It had been established by Pierre Tabeau, at one time a trader with the North West Company. Lewis and Clark had been told in St. Louis that Tabeau would

be a good source of knowledge of the country they were entering. Tabeau's first trip up the Missouri was in 1795. He took up quarters among the Arikara and remained there until 1804, the year Lewis and Clark saw him. The post and the village were probably located on Ashley Island (Mattison 1953:108-109, 118-120; Eide 1969:19).

Lewis and Clark met with several chiefs during the next several days and Tabeau and his partner were sent upstream to request other chiefs to attend a conference. A council was held with the chiefs of all three Arikara villages in the immediate vicinity. Gifts were exchanged and the expedition continued. On October 11, Lewis and Clark held further meetings with Arikara chiefs. They camped about nine miles farther up the Missouri on October 12 and met with more Arikara. One of the Arikara chiefs agreed to accompany them with the intention of visiting the Mandans. The explorers left early the next morning, passed a Sioux camp, and made 18 miles before making their last camp adjoining the overview area (Mattison 1953:120-121, 122-124, 140-141, 150-151).

Lewis and Clark also passed through the study area on their way downstream in 1806. On August 20, 1806, the expedition camped just south of the present North Dakota line after having covered 81 miles from their previous night's camp. It had been a wet, windy day with waves that washed into their canoes. They noted the many changes in the river's course since their upstream trip two years earlier. The next night found them about 29 miles farther downstream. At this camp they met three French-American traders bound for the Mandan villages upstream and supplied them with ammunition. The expedition held a council with the Arikara and a party of Cheyenne who had come to trade with the Arikara. After a rainy night and another council with the chiefs the party continued downstream to camp well below the mouth of Grand River (Mattison 1953:151-152, 137-138, 106-107).

While the Lewis and Clark Expedition ostensibly opened the Upper Missouri to the American fur trade, it would be more than twenty years before that trade would be carried on permanently and successfully. Despite problems with the Sioux and the Arikara, some traders followed practically in Lewis and Clark's footsteps. On their return to St. Louis in 1806 the expedition encountered eleven parties headed upstream to engage in trade. By that time John Colter had already left the expedition at the Mandan villages to guide an outfit of traders up the Yellowstone (Robinson 1966:48; Eide 1969:218).

The Hudson's Bay Company and the North West Company were engaged in open warfare with each other at the time Lewis and Clark visited the area. Although their representatives met cordially with Lewis and Clark at the Mandan villages and appeared friendly the British companies may well have been behind the growing hostility of the Arikara and Sioux tribes toward American traders (Dunn 1963:157-177; Robinson 1966:34-35).

In 1807, a party of 95 traders, soldiers and Indians left St. Louis for the Mandan villages to trade and to return the Mandan chief Big White, his family and several Sioux to their homes. Chief Big White and his family had accompanied Lewis and Clark to Washington, D.C. the previous year.

When the party reached the Arikara villages they found that the Arikara and their Sioux allies were at war with the Mandan and that the Arikara had

turned unfriendly toward Americans. In part the change in attitude may have been caused by the death of an Arikara chief during a visit to Washington. The Arikara and Sioux were determined to prevent the traders from reaching the Mandan and they eventually opened fire on the party. Four men were killed and ten men were wounded on the keelboats. Pryor and Chouteau returned to St. Louis without having accomplished most of their mission. For the next two years no American traders were licensed to deal with the Arikara (Robinson 1966:48).

Manuel Lisa, a St. Louis businessman and fur trader, and his party left for the Yellowstone that same summer of 1807. Lisa and his group were successful in passing the Arikara and ascended the Yellowstone River to build a fort at the mouth of the Bighorn River, the first American fort in Montana. Lisa and his group conducted a successful trade in the Upper Missouri country until the War of 1812. Lisa's success led to the formation of the Missouri Fur Company at St. Louis.

In the spring of 1811, an American Fur Company party led by Wilson Price Hunt and a second party led by Manuel Lisa both left St. Louis. Lisa reached the Hunt party above the Omaha and the two parties traveled together to the Arikara villages near the mouth of the Grand River. There, Hunt's party purchased horses and proceeded overland for Astoria at the Columbia River. As a consequence this expedition was later known as the Astorians. Their route went up the Grand River for a distance from the Arikara villages, then turned southwest toward the upper reaches of the Little Missouri River. Accompanying the Hunt expedition to the Arikara villages were two tourists, Henry Brackenridge, a young American, and John Bradbury, a Scotch naturalist. Their journals provide an eyewitness picture of the life of the place and time (Chittenden 1902:184-197; McFarling 1955:27, 39).

On May 8, 1812, a Missouri Fur Company expedition left St. Louis comprised of more than 80 people and led by Manuel Lisa. This party built Fort Manuel (39CO5) above the mouth of Hunkpapa Creek, in what is now Corson County, South Dakota. Most of the men who accompanied that expedition pushed on to trap, hunt, and work at other establishments up river. Only a small group remained at Fort Manuel for the winter. The record of the fort, contained in the journal of the clerk, John C. Luttig, extends only from the day the expedition left St. Louis until March 5th, 1813 when it ends abruptly. Other documentation of the fort is apparently non-existent, but in all probability the fort was abandoned at that time, along with the other upper river posts, due to escalating hostility of the Sioux and Arikara tribes. Luttig's journal (1920:106) reported that on December 12, 1812, "the Snake squaw, age about 25, of Charbonneau, a good woman, died of putrid fever." Indications are that this woman was Sakakawea who had accompanied Lewis and Clark, but there is no documented proof.

The War of 1812 and the Indian hostilities from the upper Yellowstone to the Arikara villages only helped to cement the Canadian domination of the upper Missouri trade. After the war the Americans felt an urgent need to re-establish authority over the Upper Missouri country. In 1819, the United States sent Colonel Henry Atkinson and a force of about a thousand men to build a permanent military post at the Mandan villages. The expedition went up the river on steamboats but the boats were only able to

reach Council Bluffs, Iowa. There Fort Atkinson was established. For a number of years it represented the closest American military presence to the Upper Missouri (Robinson 1966:82-83).

At least one major confrontation between the Arikara and the fur companies took place in the study area during the fur trade era. In 1823, William Ashley organized a Missouri Fur Company party of 100 and began ascending the Missouri River. A group of Arikara attacked Ashley's party near the mouth of the Grand River in June, killing 14 men and preventing their passage upriver (Schell 1968). The group sent a request for help to the army post at Fort Atkinson. Colonel Henry Leavenworth set out with 220 soldiers and was joined along the way by 80 of Ashley's men, another 40 Missouri Fur Company trappers led by Joshua Pilcher, and approximately 400 Sioux (Schell 1968).

On August 9, the Arikara were engaged and forced to retreat into two of their villages. Leavenworth shelled the villages repeatedly on August 10 and killed the Arikara leader Grey Eyes, but he was unable to drive the them from their villages (Mattison 1953). Over the next several days, as Leavenworth vacilated over whether or not to attack again, the Arikara sued for peace and eventually signed a treaty agreeing to repay the trappers for their losses and promising to live in peace. Many of the Arikara, however, slipped away before they were forced to repay the trappers (Mattison 1953).

The Sioux, considering Leavenworth's actions cowardly, stole some of the army horses and mules and left the area. The trappers were so angered that Joshua Pilcher wrote Leavenworth a scathing letter accusing him of making things worse rather than better for the traders on the Missouri (Dunn 1963:179; Robinson 1966:83-85).

In 1825, the Atkinson-O'Fallon expedition ascended the Missouri to pacify the up-river tribes and open the region to peaceful trade with the Americans. General Henry Atkinson was the military commander and Benjamin O'Fallon was the Indian Agent. They left from Council Bluffs that spring with 476 soldiers in unique keelboats. The boats were propelled by paddle wheels which the soldiers turned by hand (Chittenden 1962:383). Treaties were signed with sixteen tribes from Council Bluffs to the Knife River. Atkinson reported no sign of British influence and concluded that no permanent military post was required above Council Bluffs. The Upper Missouri had been essentially opened to the American fur trade (Robinson 1966:85; Dunn 1963:179).

The Missouri and Grand rivers served primarily as routes to and from the fur trade. Fort Manuel, the only true trading post within the overview area, lasted but a year. Traders and other travelers, both noted and unknown, visited the area from time to time but had little lasting influence on it.

The Indian Wars Era

To assist in maintaining order on the plains, the army purchased Fort Pierre from the American Fur Company in 1855 and built Fort Randall downstream from it in 1857. After the settlement of Minnesota and Iowa, Euroamericans turned their interest to the rich lands of southeastern

Dakota. In 1858 the Yankton Sioux ceded fourteen million acres and soon White settlements sprang up at Yankton, Vermillion and Sioux Falls. Dakota Territory was organized in 1861 to include all of present North Dakota, South Dakota, Montana east of the Continental Divide and the northern three-fifths of Wyoming (Robinson 1966:98-99).

Unhappy at being pushed out of their own country, frustrated at the lack of recourse and feeling cheated when promised annuities did not arrive, many of the Santee Sioux of the Minnesota River attacked area White farms and settlements in 1862. Colonel H. H. Sibley subdued the Indians in Minnesota but many fled to join other Sioux in the area of Devils Lake in North Dakota. Demands that the Sioux be pursued fostered the Sibley and Sully campaigns of 1863 and 1864 and the establishment of Fort Rice, north of the study area, above the mouth of the Cannonball River.

The opening of the Bozeman Trail from Fort Laramie in Wyoming to the gold camps of Montana in 1864 further angered the Sioux and Cheyenne. A number of Indian raids on travelers on the Bozeman Trail led the United States to send troops to supposedly permanent forts within the best remaining hunting grounds of the tribes. The Army's actions led to direct military confrontations with the Sioux and Cheyenne to the west of the study region, which plainly indicated that a much larger and permanent military commitment would be necessary to safeguard Whites in the Northern Plains. At the end of the Civil War the policy of the United States toward the Indians steadily changed from one of removal and protection to one of containment and subjugation.

A massive conference was held at Fort Laramie in 1868 and the resulting treaty with the Sioux and Cheyenne contained elements of both the old and the new Indian policies. The United States agreed to abandon the hated Bozeman trail and the military posts on the trail. In return the Indians agreed that the Union Pacific Railroad could be built across Nebraska and southern Wyoming. All the tribes of the region were assigned to large reservations which more or less conformed with the territories claimed by the tribes. The "Great Sioux Reservation" included all of present South Dakota west of the Missouri River and two large wedge-shaped segments to the east of the Missouri. To the west of the Reservation was a huge territory deemed to be unceded Indian territory in which all the tribes maintained a right to hunt but not to live permanently (Royce 1899:848).

According to the Fort Laramie Treaty of 1868, the Sioux were to receive annuities of food, tools and animals at several agencies located on or near the Missouri River. The Grand River Agency was established in 1868 to serve the northernmost part of the Great Sioux Reservation. The agency was located about one mile north of the mouth of Oak Creek, in bottomlands near the banks of the Missouri. Buildings were constructed of cottonwood logs and rough lumber milled near the agency. By 1873 the buildings were in poor condition and the main agency was moved upstream approximately 55 miles to the present site of Fort Yates. The old facility thereafter served as a subagency. The site of the Grand River Agency is now inundated (Mattison 1953:116; Milligan 1976:12-15).

The Grand River Agency served some of the most traditionally minded Sioux, including Hunkpapa, Yanktonai and Blackfeet. In 1870, an estimated 4,500 Indians were attached to the agency which was under the

administrative control of the Catholic Church. Despite the hostility of some of the Sioux toward Whites in general and especially the Army, acts of belligerence between Indians and members of the small Army detachment were rare at the agency (Mattison 1953:115).

Life at the agency was hard for the Indians. Annuities arrived sporadically and were often of inferior quality and small quantity due to spoilage during the long period of shipment and fraud within the Indian Bureau. A few hundred acres were brought under cultivation at a location about four miles from the agency but these fields were far insufficient to provide food for the resident Indian population. Game became virtually non-existent near the agency and the food shortage became more acute after the Indians were required to live within fifteen miles of the agency (Milligan 1976:23).

The winter of 1874-1875 was particularly severe at the Standing Rock Agency, the successor to the Grand River Agency. The Indians were put on half rations because the annuity goods did not arrive before winter set in. The Indians became understandably sullen but they did not commit hostile acts against Whites at the agency. By the time the rations arrived in late spring most of the Indians were near starvation and many had abandoned the reservation life to join kinsmen in the unceded hunting areas to the west of the reservation. Sioux continued to slip away from the agency in growing numbers until the spring of 1876. The starvation conditions on the reservation led "hostile" Sioux like Sitting Bull to conclude that dying in battle against the Whites was preferable to starving at the agencies (Milligan 1976:25-26).

In the spring of 1874, Lieutenant Colonel George Armstrong Custer led a mapping expedition to the Black Hills. Gold was discovered and before the troops had returned to Fort Lincoln that August, a stream of miners began to invade these lands which had been guaranteed to the Sioux. Until the late fall of 1875, the Army had orders to stop and remove all Whites in and bound for the Black Hills. By that fall, however, the task proved impossible with the available troops. Settlement and mining became widespread throughout the Hills and the Sioux and Northern Cheyenne, to whom those lands were sacred, were irate. Open hostilities broke out between Indians and Whites. Pressured from all sides and concerned about the growing number of Indians in the unceded territories to the west of the reservation, the government ordered all Sioux to the Missouri River agencies by November of 1875, or they would be considered hostile.

With little game, short rations, and the fear that their ponies and arms would be confiscated by the Army, large numbers of Sioux and Cheyenne slipped out of the agencies during the winter of 1875-1876 and the spring of 1876. They gathered at the best of the remaining hunting grounds, south of the Yellowstone River and north of the Bighorn Mountains, in north-central Wyoming and southern Montana. In the spring and early summer of 1876, the Army mounted a powerful three-pronged campaign to defeat the off-agency Sioux and Cheyenne and to force them permanently onto the reservations. One major force of the campaign departed Fort Abraham Lincoln on the morning of May 17, 1876, under the command of General Terry. On the 25th and 26th of June, Custer and the Seventh Cavalry met the Sioux and Cheyenne in a colossal battle on the banks of the Little Bighorn. Custer and his immediate command of five companies were killed. The

remaining six troops under Captain Benteen and Major Reno were beseiged with heavy losses until rescued by other units of the expedition.

The Little Bighorn was a great victory for the Indians but it hardened the resolve of the Whites even more. During the rest of the summer of 1876 and on through 1877 additional troops scoured the Northern Plains for all remaining hostiles. Most bands of Indians were hounded and harassed until they eventually surrendered. A few, including Sitting Bull and his band, escaped to Canada. In the following four years some of these who had reached Canada made raids back across the border into northern Montana. Finally in 1881, Sitting Bull and the remaining hostiles surrendered at Fort Buford without a fight (Hanson 1909:290-376; Robinson 1966:178; Malone and Roeder 1976:91).

In 1876-1877, the Sioux were forced to cede to the United States all lands outside their present reservations including the Black Hills and the hunting territories to the west. In 1882 the Great Sioux Reservation was divided into five separate reservations, the Standing Rock Sioux Reservation being the largest, and the total territory in Sioux ownership was further decreased (Royce 1899:848-849).

After Sitting Bull's surrender, his people were sent to Fort Yates and settled at Standing Rock and Grand River, the latter now a subagency. Sitting Bull himself was sent down to Fort Randall but he later was brought back to Standing Rock where he lived in a cabin near present Bullhead.

Rumors of a new Messiah swept through the Indian peoples of the West and by 1890 a number of the traditional leaders, including Sitting Bull, embraced this new cult and the Ghost Dance which epitomized it. It seemed to be a means to recover their traditional values and once again gain pre-eminence.

After Sitting Bull ignored requests and demands that he discontinue the Ghost Dance, Agent McLaughlin of Standing Rock ordered the Indian police to arrest Sitting Bull in December of 1890. On December 15, just before daylight, Lieutenant Bullhead and 43 Indian police went to Sitting Bull's cabin to arrest him. At first submissive, the old man was taunted by some of his younger followers and at the last minute he resisted. In the confusion of the fray, Sitting Bull, six of his followers, and five of the police were killed. After Sitting Bull's death troops were sent to round up all Ghost Dancers who had fled from the agencies to the Badlands. Troops of the Seventh Calvary intercepted Big Foot's band at Wounded Knee Creek and slaughtered three hundred Indians in the "battle." The Battle of Wounded Knee essentially ended the era of Indian-White military confrontation in the region (Mattison 1953:163-164, 165; Robinson 1966:178, 182).

Missions and the Reservation

During the Grant Administration, Agent Palmer at Standing Rock suggested that the Indians might benefit from the efforts of missionaries and teachers. President Grant's wife espoused this cause and the order was given to divide the reservations among denominations which wished to get into the missionary business with the Indians. The theory was that saving

the red souls would also make white man's civilization more acceptable to them; that Christianization by private religious organizations was both good for the Indian and cost efficient for the government (Milligan 1976:28-29).

Episcopal, Presbyterian, Congregational, and Catholic missions already active among the reservations were uprooted by this policy. Some of the missions were relocated. Some of the changes resulting from this policy were ridiculous. The Sisseton reservation in northeastern South Dakota had been primarily Catholic but was turned over to a Protestant denomination. At the time the policy was instituted, Catholic missions served 38 of the 72 agencies. The Catholics lost control of all but eight of these missions and 80,000 Catholic Indians came under Protestant domination. Standing Rock was contracted to the Catholics, but the adjoining Cheyenne River Reservation was contracted to the Episcopalians (Milligan 1976:39; Duratschek 1943:56).

In addition to maintaining churches the reservation missionaries often operated schools and industrial boarding schools. The industrial boarding schools provided a more advanced type of training with half of the time devoted to vocational pursuits. In the boarding schools the students learned by doing, furnishing most of the labor for the school. The boys learned such trades as carpentry, tailoring, shoemaking, and farming. Girls were taught homemaking skills such as cooking, laundering, sewing, and gardening (Duratschek 1943:55).

In 1870, Father DeSmet arrived on the Far West at the Grand River Agency where he baptized 200 children and four adults. In 1875, Father J. B. A. Brouillet, director and treasurer of the Bureau of Catholic Indian Missions, proposed a boarding school on the Standing Rock Reservation. St. Benedict's Mission, known for years as St. Benedict's Agricultural and Boarding School, was founded by Bishop Martin Marty in 1878. The location became the town of Kenel (39CO3), named for Father Martin Kenel who served the school as superintendent from 1884 until his retirement in 1906. The school was later moved to Fort Yates (Duratschek 1943:46, 58, 78; Mattison 1953:152-154).

A mission day school was opened by the Catholics at Cannonball, on the north end of the reservation, in 1883, and 45 children were enrolled. Abbot Marty, soon to become Bishop of Dakota, served with three priests and eight sisters, plus two lay brothers and an ecclesiastical student, on the reservation at that time.

Other missions and churchs became established on Standing Rock Reservation, not all of them Catholic. In 1884, Reverend T. L. Riggs opened a Protestant mission and day school at Running Antelope's camp on the Grand River. Reverend Riggs had published a Sioux dictionary some years earlier and the Grand River students received their lessons in the Sioux language. Bishop Hare of the Episcopal Church established St. Elizabeth's Mission above the mouth of the Grand River in 1885. Reverend Deloria, a native Sioux and an ordained Episcopal minister, was in charge. The school had twenty pupils (Mattison 1953:112, 113; Milligan 1976:109, 111, 114, 116, 118).

A number of notable Sioux leaders who had been with Sitting Bull settled in the Grand River area at least in part because of the influence of the missions and the opportunities the mission schools offered to the Indians. Chiefs Gall and John Grass both settled near the Grand River and both became respected and able judges in the Indian courts. Gall is buried at St. Elizabeth's Mission (Milligan 1976:122, 125, 135; Nesset n.d.:3).

Transportation

The Missouri River became the artery of commerce for the region during the fur trade era. Prior to that time, transportation within the overview region was primarily on foot or horseback although some navigation of the river by means of bull boat did occur.

The river was the means for shipping trade goods to the fur trading posts and sending the furs back down to St. Louis. Over the years a number of types of craft were used on the Missouri. Chittenden devotes 19 pages of his History of Early Steamboat Navigation on the Upper Missouri to describing these vessels. They go from the simplest Indian bull boat, a round, single-seat boat made by stretching a buffalo hide over a willow framework, to large steamboats. In the days before 1832, keelboats and mackinaws were the main means of hauling cargo on the river. Keelboats, which were usually built in Pittsburgh, were up to 70 feet long, and comparatively expensive. They could be fitted for freight or passengers and were towed upstream by men on shore, poled or rowed and sailed when conditions were right.

Mackinaws were smaller, much cheaper, and usually used for downstream travel only. Flat bottomed and approximately 50 feet long, they normally carried a crew of five and 15 tons of freight. Smaller boats including canoes and pirogues were used for travel by individuals and small groups.

It wasn't until the development of the small, broad, light-draft "mountain" steamboat that the Missouri became a major highway. The first such boat, the Yellowstone was built for the American Fur Company. It got upstream as far as Fort Tecumseh in 1831 and was the first steamboat to pass the overview area the following year. From that time until the arrival of the Milwaukee Railroad in 1900 at Evarts, the steamboat would be a major factor in the transportation of the region (Chittenden 1962:23; Robinson 1966:90; Lass 1962:90-109).

Henry Brackenridge and John Bradbury traveled up the Missouri with the Hunt party in 1811 and returned downstream with Lisa that fall on keelboats. The era of the steamboat brought more celebrated visitors. George Catlin, the artist, passed the overview area on the first voyage of the Yellowstone to the Upper Missouri in 1832. Maximillian, Prince of Wied-Neuwied, and his artist, Karl Bodmer, followed the next year. Audubon, the artist-naturalist, made the trip on the Omega in 1843. Father DeSmet travelled the river on steamboats more than once, the first time in 1851 (Robinson 1966:90-91,321; McFarling 1955:27, 39; Lass 1962:141, 150, 189).

Steamboating boomed after 1862 with the advent of the Montana gold rush. The boats carried supplies and miners to Fort Benton and other points on the far upper river and returned with ore, gold and disappointed

gold seekers. After the arrival of the Northern Pacific Railroad in Bismarck in 1873, traffic diminished considerably in the Grand River area although a number of boats still passed the point annually. The Grand River agency was served mostly from Yankton and Sioux City, with occasional shipments downriver from Bismarck (Robinson 1966:106-107; Lass 1962:89-104).

By 1885, the Upper Missouri steamboat trade was mostly local in nature. Bismarck became the last major operating port on the upper river with boats hauling from Pierre to the Yellowstone. As more railroads reached the Missouri steamboat traffic declined. By 1895, traffic out of Bismarck was confined to the area from Fort Yates to the Yellowstone and only two boats ran regularly. The steamboats essentially disappeared from the upper river in 1900 and were replaced by gasoline packets which were smaller, inexpensive to build and much cheaper to operate. This efficient, maneuverable vessel was the last gasp of river transportation in this region and continued for two more decades before the advent of modern highway transportation eliminated the need for them (Lass 1962:153-161). Although a number of other types of boats existed, their importance and contribution to the river transportation period was very minor (see Chittenden 1962; Lass 1962). No boats were mentioned in the documents search as having sunk within the project area.

The Chicago, Milwaukee and St. Paul Railroad, more commonly known as the Milwaukee Road, reached the Missouri River in 1900 and the era of large scale river traffic ended in the overview region. Six years later the Milwaukee Road bridged the Missouri at Mobridge and the Grand River territory began to be served by rail transportation. With branch lines added later to Faith and Isabel, and across into the southern edge of North Dakota, the region was opened to activities which required close transportation facilities. Horse and wagon and stagecoach were replaced by motor truck and automobile in due time and the age of isolation was over (Schell 1968:250-252).

Ranching and Homesteading

By Executive Order of July 13, 1880, the Yanktonai were prohibited from living east of the Missouri. In 1882, the Great Sioux Reservation was divided into five separate reservations, Standing Rock was one of them. In return for the reduced reservation lands, the Indians were to receive breeding cattle and education such as had previously been promised but either not delivered or not delivered in promised quantities (Milligan 1976:107-108; Royce 1899:848-849).

Cultivated acreage on the reservation began to increase after 1880, when about 1,100 acres were planted by Indians for their own use and another 300 acres of wheat were planted by hired laborers for the agency bakery and as an example to the other Indians. In addition, 2,000 tons of hay were cut that fall for winter feed (U.S. Commissioner of Indian Affairs 1880; Milligan 1976:96, 98).

By 1881, more than 280 families had allotment claims and 243 were living in log houses built by government employees. Most Indians not on allotments were not planting crops in common fields. Most of Sitting

Bull's followers were brought to Standing Rock in July, after their surrender at Fort Buford, and the greater portion of them returned to the Grand River area (U.S. Commissioner of Indian Affairs 1881, 1882, 1883).

In 1882, Standing Rock Reservation had a population listed at 3,775; the next year it was 4,472. Most of the increase, however, was from Indians arriving from other locations. The natural change was actually a decrease, with 111 deaths and only 105 births. It was estimated that half of the population in 1883 had contracted tuberculosis (Milligan 1976:101-104). Despite these grave conditions, there were no longer any alternatives to reservation life. In 1882, Agent McLaughlin accompanied a bison hunt from the Standing Rock Agency to southwestern North Dakota and a large number of the beasts were killed. It was the last major hunt and marked the end of the great herds. The wholesale commercial slaughter of the bison by teams of White hunters had been going on in the Northern Plains since 1876, encouraged by the government as a means of depriving the Indians of an independent livelihood. In 1883, commercial hunters could find but a few of the animals.

Settlement by Euroamericans of the country to the east of the Missouri River accelerated after the Northern Pacific Railroad reached Bismarck in 1873. White settlement remained distant from the Standing Rock Reservation for some time because 1) more choice lands for homesteading were available elsewhere, 2) the reservation was not open to non-Indian settlement, and 3) easy transportation was not available to the reservation until the railroad arrived.

Although most of the Standing Rock lands were not good for farming, they were well suited to stock raising. Euroamericans started several ranches adjacent to the Reservation and leased non-allotted Indian lands after 1880. The ranchers eyed the Grand River country enviously but the lands were not yet available to them. In 1902, large tracts of Standing Rock Reservation lands were opened to lease. The Lake, Tomb, and Lemmon L7 Ranch leased 865,000 acres and became the largest in the territory at that time. The L7 was reputed to own 80,000 to 90,000 nead of cattle at one point. Other big ranches, most taking over portions of the former L7 lease, included the C7 with perhaps the lion's share of the old L7 lease, the ZT, and the DX. There were also a number of Indian holdings fenced off from the big open-range outfits (Chapman 1965:16; Tidball 1976:37; Schell 1968:251).

That these ranches were truly big business can be seen by their statistics. The L7's over 80,000 head, were worth about $60 each, totaling $5,000,000 in 1906 dollars. Using an average multiplier of fifteen to convert that to present dollar value, the estimate in today's prices is $75,000,000 (Clay 1962:229, 230; Schell 1968:251).

The tracks of the Chicago, Milwaukee and St. Paul Railroad reached the Missouri River south of present Mobridge in 1900. There the townsite of Evarts was platted and the following year huge corrals were built both there and opposite the town on the west side of the Missouri. In 1902, a pontoon bridge was built to connect the two corrals. The bridge was used only a year, after that the cattle were ferried across in high water and forced to swim the Missouri when the water was low. Dipping tanks and

loading chutes were added to prepare and load the stock into the railroad cars for market.

For its short life between 1900 and 1907, Evarts was one of the biggest stock shipping points in the country. As many as 128 carloads of cattle, at an average of 20 head per car, were driven across the pontoon bridge in a single day. Once 1,300 head were branded in six hours, and 3,300 head were dipped in three days. The town of Evarts quickly supplied all of the necessities of a wide-open cow town: hotels, supply stores, saloons, gambling houses and brothels (Tidball 1976:31-32; Schell 1968:251).

Part of the Evart's success was due to the leasing of the "Strip", a piece of land six miles wide, supposedly taken equally from the Cheyenne River and the Standing Rock reservations, that extended 87 miles and paralleled the Grand River. The Strip was fenced on either side for its whole length, with periodic cross fences to control movement of the cattle driven along it. A toll to be paid to the Indians was supposed to be collected for all cattle driven down the Strip at the rate of $.25 per head, with no charge for Indian cattle. No sheep were allowed on the strip. The Milwaukee Road constructed dams and watering holes roughly 12 miles apart, a day's drive for the cattle. Trail City, named for the trail, was also built to provide needed facilities.

Evarts disappeared after the railroad bridged the Missouri at Mobridge in 1906. With the reservation opened to homesteading in 1909, and the railroad crossing the area, the strip was no longer used and Trail City's usefulness also passed (Tidball 1976:32-33; Schell 1968:251).

Nels Morris and Company of Chicago, with holdings in Texas and Kansas, had taken up much of the C7's Standing Rock lease in 1906. This ranch was about 40 miles from east to west and 50 miles from north to south. They had about 20,000 head of cattle on their range in the fall of 1906. The previous winter had been a bad one, but 1906-07 was far worse. Little hay had been put up, snows started to fall early and there were continuous storms until May. Cattle drifted unimpeded in search of food and shelter. Over the winter of the "Big Drift", cattle wandered from as far away as Montana and western North Dakota to the Grand River country. They broke through fences to find food. When the thaw finally came, some creeks in the region were choked with thousands of rotting carcasses (Tidball 1976:44-46).

Three years later there was another bad winter. While ranching still remains the primary source of income in this region, those winters put a final end to the days of the enormous stock outfits. A number of the brands remain, memoirs of the open-range days. The towns of Lemmon, Walker and Morristown are named for leading ranchers of that era. After the homesteading boom began in 1907, the settlers were in conflict with the cattlemen. The settlers, greater in number, gained the upper hand and the open-range was ended by law in 1911 (Schell 1968:252-257).

Between 1904 and 1913, a series of agreements were negotiated with the Teton Sioux subtribes whereby over four million acres of land were opened for homesteading. The price ranged from $2.40 to $6.00 per acre and the selection of non-Indians who could claim the "excess" lands was determined by means of lottery. Sales were limited to 640 acres for one individual.

The resultant income was to be placed in a trust fund for the tribes on the respective reservations. In 1909, approximately ten thousand claims were opened on the Cheyenne River and Standing Rock reservations. By 1915, more than 600 additional homesteads, totalling approximately 100,000 acres of the Standing Rock Reservation, went on the market. A new look appeared on the plains as homesteads began to dot the landscape with their shacks and cabins and fenced fields. The large cattle companies gradually disappeared and were replaced by many small ranches. The smaller rancher was often able to obtain additional pasture land by leasing Indian allotments and by grazing on abandoned claims (Schell 1968:253, 255).

The west-river country more than tripled in population between 1900 and 1910. New towns appeared as railroad lines pushed through the region. Because of the required "final proof notices", newspapers mushroomed in numbers. Then, when severe droughts hit in 1910 and 1911, farmsteads were abandoned in wholesale numbers. The west-river population shrank by more than 10 percent between 1910 and 1915 (Schell 1968:256-257).

The agricultural depressions following World War I and during the period of the Great Depression in the 1930s took a further toll of the population. With the change to motor vehicle travel and the abandonment of railway lines many small communities have disappeared. The bulk of the country west of the Missouri River receives less than 16 inches of moisture a year and has returned primarily to stock raising with a limited amount of dry-farming still prevalent. Within the immediate overview area, many of the old settlements have become extinct and only three small towns remain: Kenel (now relocated), named for the Catholic priest Father Martin Kenel who served as school superintendent at Kenel; Mahto, from the Sioux word for bear; and Wakpala from the Sioux word for creek. Wakpala is the largest of the three. The major commercial centers are McLaughlin on the west and Mobridge on the east (Schell 1968:358, 362-366).

CHAPTER FIVE
METHODS AND TECHNIQUES

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Research Orientation

In considering a research design, it is essential to keep in mind the level of inventory to be undertaken as well as the overall management goal of such a project. Chronologies, interpretations of artifact function and discussions of cultural change and continuity within the Middle Missouri subarea have all been highly centered around excavations and not on surface inventories. Sites which have not been excavated are usually not considered in discussions concerning the distribution of variants, variation within traditions or temporal and spatial boundaries of cultural horizons (e.g., Lehmer 1971).

The primary goal of the research design proposed for the project is, in many ways, quite different than that utilized in previous studies in the Middle Missouri subarea. Except for Archer et al. (1982), few studies have attempted to predict archeological site locations. In a sense, the design proposed addresses both research and management concerns about cultural resources along Lake Oahe. The proposed research will be aimed at gathering a concise body of data relating to the types of cultural resources present, the characteristics of the site setting in which each type occurs, the relationship of a site's location to its chances for long term preservation and the utility of all of this information in predicting where buried cultural deposits may be exposed in the future.

The extant data from previous inventory work in the Middle Missouri subarea as well as other regions indicate that:

1) Prehistoric site and isolated find locales are extremely predictable when compared against locations not containing sites. Nearest neighbor discriminant analysis, for instance, has been found to be able to correctly predict site or nonsite occurrence with approximately 75 per cent accuracy using only three environment/locational variables (Larson et al. 1986).

2) Prehistoric sites consisting of small cultural material scatters and other areas containing only isolated finds on the surface often occur in settings similar to those of large occupation sites or at locales similar in setting to those containing buried cultural strata.

3) It is believed that the inability to view the shoreline of Lake Oahe during periods of low water has resulted in many cultural resources going unrecorded. While a large number of these resources are probably in a poor state of preservation, obtaining locational information on them would add greatly to the predictive power of existing settlement models for the region.

4) Investigations by other researchers (e.g., Bettis and Benn 1984) have demonstrated that the mapping of Late-Wisconsinan and Holocene terrace systems aids in predicting both site distribution patterns and assessment of the potential for preservation of sites of various ages.

While this report will provide detailed descriptions of the cultural resources encountered during the inventory (see Chapter Six), it is also our intent to use this information to generate well founded recommendations for future research. This will include discussing those sites which are being most rapidly destroyed by erosion and presenting predictions as to where undiscovered, burial cultural deposits are likely to be found in the future. Chapters Seven, Eight and Nine and Appendix A provide detailed information concerning the above research questions as well as other pertinent information involving the cultural resources within the project area.

<u>Survey and Recording Techniques</u> (See also, *Historic Methods*)

Inventory Techniques:

The total project area was inventoried by two crews each composed of the Project Supervisor or the crew chief and two to five additional crew members. Crew size varied in response to differences in the width of federal land. The basic survey methodology employed by Larson-Tibesar Associates utilized a series of parallel survey transects with crew members spaced approximately 30 meters apart. It is believed that maintaining spacing as close to the standard as possible provides the most consistent, controlled coverage of an area.

Recording of Sites and Isolated Finds:

Prehistoric cultural material observed during the inventory phase of the project were identified and recorded as either a site or isolated find. The distinction between site and isolated find was based on the density of surface materials, potential for buried cultural materials and the presence of cultural features. In general, a locality was recorded as a site if cultural features or buried cultural deposits were present or if the density of surface materials was greater than one item per approximately 3600 square meters. This corresponds to coverage of a 60 X 60 meter area. Once an item was located, the person finding the initial item as well as the adjacent personnel on either side in the transect line begin an intensive examination of the immediate area. Since the distinction between site and isolated find is often arbitrary, use of this type of approach allowed us to at least quantify our definitions as well as making the results comparable between areas or studies.

At prehistoric sites, the minimal documentation procedures were as follows:

1) Intensive examination of the area by the entire crew.

2) At all sites, the location of all cultural features, artifacts and noted concentrations of artifactual materials were marked with pin flags.

3) The location of site boundaries, observed features and any collected cultural materials were mapped using a portable transit and stadia rod.

4) A datum marker was left at each recorded site. The location of this datum was tied into surrounding topographic features and Corps boundary markers, whenever possible.

5) All sites were photographed and appropriate South Dakota Archaeological Research Center site forms were completed. The location of all sites were plotted on field maps and transferred to clean copies for inclusion on site forms, available aerial photos and on-going project area maps.

Collection of cultural materials was restricted to those items believed to have temporally or culturally diagnostic potential and which were useful to the overall goals of this project. Collected materials will be curated at the South Dakota Archaeological Research Center in Rapid City. The location of all collected items were mapped prior to any collection to provide minimal loss of contextual information as a result of collection.

The procedures outlined above are aimed at gathering a body of comparable data from all sites recorded as economically as possible while providing an empirical background upon which statements of significance can be used.

Analysis of Aboriginal Sites

The prehistoric artifact categories are described in detail since these types of categories can be quite arbitrary compared to historic artifact types (e.g., glass bottle) and due to the fact that the categories are utilized in the analysis of prehistoric lithic resource utilization pattern presented in Chapter Eight.

Aboriginal artifactual material was generally analyzed in the field and not collected. Table 3 illustrates the Larson-Tibesar coding format which was utilized for the recording of aboriginal artifacts and features. These same categories were encoded on the site mapping forms and into a computerized database used to generate site map legends, in the cataloging of collected artifacts, and in forming tabular summaries for the project.

Lithic Assemblage: Initially, all lithic materials were separated into two general groups: those items without evidence of intentional usage and those exhibiting deliberate modification or modification occurring as a result of use (see e.g., Ahler 1975). Items included within the first group are referred to as debitage, waste flakes, or unutilized flakes. The other group includes items generally referred to as "tools". This latter group has been further divided into various tool types based on general morphological characteristics and implied functional uses. The function of items included within these categories must, however, be assumed as tentative since no exhaustive microscopic use-wear analysis (e.g., Keeley 1980; Frison 1968; Tringham et al. 1974; Hayden ed. 1979; or Ahler 1971) was performed as this is beyond the scope and intent of the present study.

Lithic Debitage: Lithic debitage was size graded and separated into the appropriate stage of decortication and raw material types. Size grades utilized in the study are listed in Table 3. Stages of decortication refer to the amount of cortex or outer weathered rind on any particular flake and include three categories: primary (100-75%), secondary (75-1%) and tertiary (0% cortex).

The separation according to raw material types was accomplished through the visual inspection of each piece and comparison with written descriptions and/or laboratory samples. A brief written description of each category is presented below.

Knife River flint is widely known as a distinctive, fine, dark to medium brown flint. The major source of this material is believed to be western North Dakota (Clayton et al. 1970). Secondary sources are also believed to occur in Pleistocene alluvial and glacial deposits and Holocene alluvial deposits.

Recently, Nowak and Hannus (1981) have described a dark brown chalcedony, known as Scenic Chalcedony, which has "all of the same empirical characteristics as Knife River flint" (Nowak 1983:16.8). The source area for this material is in the vicinity of Scenic in southwestern South Dakota. While it is possible that some of this material was mistakenly classified as Knife River flint, it seems likely that most of the materials are Knife River flint due to the proximity of the project area to the latter source area.

Tongue River Silicified Sediment is characterized by a gray, yellow or red colored cemented sand with occasional fossilized plant remains. Source areas are described as western North and South Dakota with secondary deposits noted in northwestern Iowa (Anderson 1971). Originating out of the Morrison Formation (Craig 1983:40), both primary and secondary deposits of gray and gray-yellow and red varieties also occur throughout most of Wyoming and Montana and is generally referred to as Morrison silicified sediment or Morrison quartzite. For this particular project area the red/yellow varieties are generally thought to be derived from local secondary deposits (see Ahler 1977b).

Plate Chalcedony is a distinctive gray to pink chalcedony which Ahler (1977b:136) describes as:

> ...associated with the Chadron and Brule formations within which it was formed as a precipitate or evaporite within narrow, near vertical fissures or joints. upon erosion of the Brule, quantities of this stone are deposited on the deflating ground surface as flat angular, parallel-sided plates of grey...
>
> Outer surfaces of the plates have a distinctive matte, pebbly appearance which, incidently, was often used as an abrasive grinding surface. Plates vary most commonly from 5 to 20 mm in thickness, with a narrower range being selected for cultural use.

Table 3. Explanation of lithic coding.

MATERIAL TYPE

1. Knife River Flint
2. Morrison quartz./grey Tongue River
3. yellow/red T.R.S.S.
4. plate chalcedony
5. Bijou Hills quartz.
10. coarse quartzite
11. fossiliferous chert
12. misc. chert
13. misc. agate/chalcedony
14. porcellanite
15. obsidian
16. nonvolcanic glass
17. petrified wood
20. sandstone
21. granite
22. diorite
23. quartz crystal
30. fine-grained quartzite

ARTIFACT TYPE

1. projectile point
2. biface
3. end scraper
4. side scraper/ retouched flake
5. utilized flake
6. mano
7. metate
8. drill/graver
9. core (non-utilized)
10. flake
11. hearth
12. fire-cracked rock
13. stone circle
14. non-itemized lithic concentration
15. bone (nonutilized)
16. hammerstones
17. chopper/chopping tool, utilized core tool, etc.
18. bone tool
20. mound
21. depression (not historic)
22. ditch (not historic)
30. body sherd
31. rim sherd
40. feature in bank

COMPLETENESS*

Stone Tools:
1. complete
2. fragment
3. tip
4. midsection
5. base

Debitage:
6. primary
7. secondary
8. tertiary

Ceramics:
21. cord roughened
22. smooth/plain
23. simple stamped
24. check stamped
25. brushed

SIZE GRADE**

1. Less than or equal to ¼ inch
2. Greater than ¼ but less than or equal to ½ inch
3. Greater than ½ inch but less than or equal to 1 inch
4. Greater than 1 but less than or equal to 2 inches
5. Greater than 2 but less than or equal to 3 inches
6. Greater than 3 inches

* -- Completeness not coded for utilized flakes.
** -- Size grading based on greatest dimension of item.

Bijou Hills quartzite is characterized as a greenish-gray, coarse grained quartzite or silicified sediment. Outcrops of this material are present along the Missouri River at various locations in Brule, Gregory and Charles Mix counties in southern South Dakota and Corson County in northern South Dakota (Ahler 1977b; Nowak 1983).

Coarse quartzite refers to miscellaneous course grained varieties of quartzitic raw materials noted by Ahler (1977b) and Nowak (1983). This report has combined the various categories due to lack of distinctive definitions and apparent overlap of one description with another. The presence of numerous quartzites within secondary alluvial and glacial deposits and the small amounts within the assemblage also restrict the interpretive value resulting from any further division of this raw material type.

Miscellaneous chert, miscellaneous agate/chalcedony and fine-grained quartzite also represents a condensation of other varieties of chert. The primary difference between the first two categories is that opaque varieties are classified as chert while translucent cryptocrystallines are referred to as agate/chalcedony. The rationale for this is similar to that presented in the previous category.

Fossiliferous chert, porcellanite, obsidian and nonvolcanic glass are distinctive raw materials common to Wyoming and Montana (see Fredlund 1976) but did not occur within the present project site assemblages.

Petrified wood is a locally available raw material which is characterized by the silicified remains of the original wood structure. Ahler (1977b:139) states that this material occurs within local alluvial deposits. Nowak (personal communication 1985) also reports the presence of similar secondary sources above the Grand River in the vicinity of the western boundary of the project area.

Sandstone, Granite and Diorite are types of stone used in the manufacture of tools such as manos, metates, abraders and grooved mauls. These materials were probably obtained from secondary alluvial or glacial deposits.

Quartz/quartz crystal is characterized by a coarse uneven fracture surface in the clear to milky colored coarse grained quartz or quartzite and a glass-like but somewhat uneven fracture in the fine grained clear quartz. This material occurs in relatively minor amounts and no source areas have been documented.

Chipped Stone Tools: Analyses completed on the chipped stone tools includes identification of material type (see above) and tool type. In addition, each recognized lithic tool was size graded and weighed. Eight tool types were recognized in the tool assemblage. A brief description of each is presented below.

Projectile points are thin, bifacially retouched artifacts, generally triangular to lanceolate in outline, usually with deliberate basal modification for hafting purposes. The lack of edge damage (observable without the aid of a microscope) or wear patterns along the blade margins

was used to distinguish these artifacts from other occasionally stylistically similar tools, such as bifacial knives or drills.

Projectile points differ stylistically through time allowing for a general chronological dating of the site occupation. This was accomplished by comparing the artifacts recovered from the present project to similar artifacts from other, dated sites. Cultural chronologies and terminology used in this report are presented in Chapter Three.

Bifaces are bifacially flaked artifacts without basal modifications. General outlines range from ovoid to triangular. This category potentially includes non-basal projectile point fragments as well as "knives" and other bifacial implements. Many of the specimens included within this category may also represent the ancestral manufacturing stages of various bifacially flaked tools such as those mentioned above.

End scrapers are flaked artifacts generally triangular to ovoid in shape with steep unifacial retouch. The retouch is principally along the distal margins of the tool although the retouch may extend along one or both lateral margins. The distal margin often exhibits wear patterns in the form of rounding, step fractures, or polishing formed from abrasion and/or use. Frison (1968) suggests that the presence of occasional bifacial retouch on these specimens represents the resharpening of the scraping edge.

Side scraper/retouched flake pertains to those artifacts which have predominantly unifacial retouch along their margins but are generally less stylized or symmetrical than end scrapers. This suggests a more generalized use or function for these types of tools in which either cutting or scraping actions could be accomplished.

Utilized flakes are characterized by minor edge damage on one or more edges of the flake. This edge damage is the result of use rather than intentional modification. Although the distinction between this and the preceding category may seem somewhat arbitrary, several morphological characteristics were used in differentiating these two groups.

Utilized flakes do not have an intentionally modified edge or margin. Flake scars do not exhibit the "smooth transition between the distal portion of the resultant debitage scar and the original surface of the artifact" characteristic of a retouched edge (Chapman 1977:383). In contrast, the flake scars produced through use terminate abruptly and "tend to cluster within one millimeter or less from the edge margin" (Chapman 1977:383). Also, the edge of a utilized flake generally has a more discontinuous flake scar pattern whereas retouching of an edge results in a more uniform placement of scars.

Mano and metate refer to groundstone tools. Chapman (1977:421) describes the morphology and function of manos and metates as follows:

> Metates are relatively large slabs of sandstone [or other suitable material] which exhibit flat or concave surfaces characterized by grinding wear. Milling or grinding activities, whether employed for foodstuff processing, or processing of materials such as ceramic clays, tempers, or paints, involve the use of a metate and

a mano. The metate functions essentially as a surface upon which the material to be processed rests; the mano functions as the hand-held implement which is used to crush the material against the metate. Continued use of a metate in this fashion results in formation of a surface which ranges from flat to concave along both its long and short axes.

Drills and/or gravers are tools which have narrow, elongated retouched tips. Bifacial retouch is exhibited on drills while gravers in this classification have unifacial retouch. It seems likely that these tools were used to incise grooves or holes; however, the types of materials incised and what these materials were ultimately used for remains to be investigated.

Cores refer to any nodule of lithic raw material bearing evidence of the intentional removal of flakes from that particular nodule. It is believed that the purpose of flake removal is the production of flakes which can be further modified for use as tools, or in the instance of utilized flakes, utilized without further intentional modification.

In most cases, cores are not tools themselves but the actual source of tools and flakes. Some cores do exhibit edge damage or modification which can be attributed to a secondary use of a core as a tool. Oftentimes, however, this edge modification is more likely the result of preparatory techniques for strengthening the edge of the core for subsequent flake removal. Core tools were assigned to the chopper/chopping tool category which are generally large nodules of material exhibiting limited marginal retouch and battered edge. Hammerstones are characterized by battering on the margins of a rounded durable rock.

Ceramics:

Rim sherds were identified to type using the ceramic identification keys for Middle Missouri and Coalescent tradition wares developed by Johnson (1980). One problem with Johnson's identification keys, however, is that it assumes that the cultural tradition (i.e., Coalescent or Middle Missouri) of a particular site is known (1980:15). Whenever the cultural tradition was not known the rim sherds were checked against both keys and assigned to the most appropriate category.

Site Setting/Locational Information:

In addition to the cultural information concerning each site and isolated find recorded, additional information was also gathered for each cultural locale as well as for an equal number of randomly selected locales at which cultural materials were not present on the surface. These are as follows:

Distance to the Missouri River	Using U.S.G.S. topographic maps, distances were measured to the Missouri River channel from the site or randomly selected point. The last mapped located of the channel prior to inundation was used.

Distance to Closest Permanent Tributary	The distance from the site or randomly selected point to the closest first order permanent tributary to the Missouri River (above) was measured.
Distance to Closest Intermittent Tributary	Same as above, except to the closest first order intermittent tributary.
Geologic Landform Diversity Index	The diversity of setting was calculated using the maps of landforms developed by the project geomorphologist.
Slope	Average and maximum slope, in percent grade, were calculated for each of the 40 acre units.
Aspect	Aspect is the measure of the view spread as defined by Kvamme (1981:4) which essentially quantifies the view from a particular site. The view spread is the number of degrees encompassed by an arc extended downhill from the elevational contour line which passes through the center of the site or random point. Two sizes of arc to ca. one-quarter mile (.4 km) and one-half mile (.8 km).
Timber	The area of previous tree and brush cover (combined) within a two mile radius of the site or random point was measured. The 1947 Corps of Engineers topographic maps for the Missouri River was used to calculate this area. Distance from the center of the forty acre unit to the closest indicated tree or brush cover was also calculated.
Sinuosity	Sinuosity is the ratio of channel length to downvalley distance (Leopold et al. 1964:281) and is basically a numerical rating of the amount of river meandering. This ratio was calculated for a two mile length of the river, using the original river channel, and centered at the site or random point.

In any attempts to assess site patterning through environmental criteria the ability of contemporary data (i.e., ca. A.D. 1947 through 1985) to reflect past conditions is always at least partially questionable. In the case of the present study, this is particularly true of variables relating to the Missouri River channel and tree/brush cover. Both written sources and historic maps indicate continual shifting of the river channel within the Missouri River valley. Those shifts, in turn, have tended to disrupt and change the composition of the forest communities within the valley (Burgess et al. 1973). The maximum extent of these changes through time however is ultimately believed to be governed (prior to inundation) by the geologic and climatic constituents of the valley itself. This basic assumption is believed to be consistent with other studies which relate contemporary environmental parameters to past site patterning:

> Conditions of geomorphology and soils were "constant" parameters that indicated these boundaries had remained the same over the last 5,000 years. Some changes in species type and composition would result from the input of "stochastic" (probabalistic) climatic parameters, but the generalized climatic regime has also been approximately the same during this time. Therefore, although some change in vegetative structure has probably occurred, <u>the general gradients and limiting factors have remained the same</u>...[Rener and Witter 1977:122; emphasis added].

While community patterns, stand composition and age of timber areas can and have been altered by the meanderings of the river (cf. Griffen 1977), it is not believed that the basic zone in which tree and brush growth can occur has been radically altered in the past several thousand years. Changes in vegetational patterning which have occurred can hopefully be compensated for by (a) looking at a sufficiently large radius (two miles in the present study) around the test location and (b) keeping discussion of the forest community to a general enough level so that community level composition changes are not critical to the model.

Furthermore, in a modeling process it is important to consider the results of past analyses. While the precision of current environmental parameters in predicting past conditions is certainly important, it is equally important to assess the strength of <u>any</u> variable used in the modeling process.

> A model is an effective compromise between basically inductive and basically deductive approaches. At the level of deciding what variables should be included in the model, the investigator draws on his past learning, the theory that he has mastered. But, if his deductions are wrong, his incorrectness will be demonstrated when he attempts to apply the model to real data--it won't work [Plog 1971:45].

To paraphrase Plog, the "correctness" of the variables mentioned above in the modeling process has been demonstrated using real data--they work (e.g., Larson et al. 1986).

<u>Historical Methods and Procedures</u>

As noted in Chapter One, archival research included consultation of numerous published and unpublished sources about the Oahe region. Recording and evaluation of historic period resources was originally the responsibility of the Project Historian, Kurt Schweigert. However, due to time constraints, Mr. Schweigert was unable to complete the historic site recording. The latter was accomplished by Paul H. Sanders with Larson-Tibesar Associates and Pat Persinger with Cultural Resource & Management. Historic sites were evaluated by Dori Penny and were arrived at through information compiled by Kurt Schweigert, Paul H. Sanders, Thomas K. Larson, Pat Persinger and Dori Penny (Historical Archeologist). Prior to the commencement of general survey, Mr. Schweigert provided the archeological survey team with a listing of locations of probable or known historic sites indicated by archival sources and descriptions of types of historic sites which archival sources indicate may exist in the study area. He also provided biographical information on individual names obtained from the

chain of title search. Initial location of historic period resources was accomplished by the general survey team, who briefly noted the nature and location of historic sites, flagged the sites and marked the locations of sites on appropriate U.S.G.S. quadrangle maps. The archeological survey team noted all historic period resources including depressions, artifact scatters or dumps, old roads and well-rutted trails.

Field recording included completing a South Dakota Archaeological Research Center site form which detailed the physical nature and setting of the site, physical nature and dimensions of the features and the nature of artifact remains. The historic artifacts were not described in the same detail as the prehistoric artifacts due to the fact that no specific analyses of these materials were proposed. Rather, the historic artifactual materials were described as to function (e.g., bottle, jar, seam can, machinery, etc.), material type (glass, metal, ceramic, etc.) and where appropriate glass color (clear, brown, aqua, purple, etc.) and bottle manufacturing technique. The latter two characteristics are the most diagnostic as to the age of the particular item. The artifact descriptions aided in determining the age of a particular site as well as its function. However, as will be evident in Chapter Seven, the lack of early historic remains (pre-1900s) on many of the historic habitations did not necessarily rule out the possibility of an earlier occupation. As a consequence, many of these sites were recommended for further work due to the presence of soil deposition and the possibility that earlier cultural remains were buried at the site. A site map was prepared and the general site area and selected features photographed. Collection of artifacts was limited to those items which may be diagnostic of the site's age or function, ethnic association, demographics, or former site occupants.

CHAPTER SIX
SITE DESCRIPTIONS

Paul H. Sanders and Dori M. Penny

Introduction

The purpose of this section is to provide individual descriptions of each site and isolated find which was investigated during the 1985 cultural resource inventory. The following site descriptions present summary information on each site's contents, physical location, potential for additional cultural materials, recommendations and a statement of eligibility for nomination to the National Register of Historic Places. Additional ancillary information concerning for example, elevation, distance to water, temporary field number, etc. are provided in each site form (see Volume 2, Appendix C). Table 4 provides a list of the investigated sites.

Previously Recorded Sites

39C01:

This earthlodge village, also known as the Demery site, is situated on a low terrace near the confluence of the Missouri River and a small ephemeral tributary. Although the site is listed in W. H. Over's field notes (Sigstad and Sigstad 1973:61), the first written description is provided by Will and Hecker (1944:87-88).

> This Arikara site is one of the largest sites in the area, covering the greater part of 30 acres. Most of this site has been under cultivation but on 4 or 5 acres of grass land near the creek, still in the natural state, can be seen a number of circular type lodging ruins. As near as can be determined by the potsherds and general condition of the site there was a single occupation of the entire site and the little site to the south [39C02] across a coulee was contemporary. There are no indications of ditch or palisade, which fact would also indicate simultaneous occupation of the entire site as a population requiring that much village space would have little fear of assaults by enemies.

In 1956, during the Smithsonian Institution, River Basin Surveys Alan R. Woolworth and W. Raymond Wood excavated portions of the site, in order to further examine the characteristics of this northernmost variant of the Coalescent Tradition. Their investigation resulted in the excavation of five houses and numerous related features. Based on the distribution and density of the known houses, Woolworth and Wood (1964:74) estimated that the site consists of an unfortified village of approximately 30 houses.

Table 4. List of previously recorded sites.

Site Number	Field Number	Site Description	Temporal Affiliation
39CO1	Demery	Earthlodge village	Extended Middle Missouri Extended Coalescent
39CO3	Kenel	Historic Town/Mission Earthlodge village	Extended Middle Missouri
39CO5	Fort Manuel	Historic Fort Manuel Earthlodge village	Euroamerican Post-Contact & Extended Coalescent
39CO6	Jake White Bull	Earthlodge village	Extended Middle Missouri
39CO9	Leavenworth	Earthlodge village Cemeteries	Extended Coalescent Disorganized Coalescent
39CO10	Standing Bull Village	Earthlodge village	Extended Coalescent
39CO12	Norvold 2,3 Oak Creek A & B	Earthlodge village	Extended Coalescent
39CO30	Upper Pekelder	Earthlodge village	Unknown Plains Village
39CO31	Norvold 1/Oak Creek C	Earthlodge village	Post-Contact Coalescent
39CO35	Wilbur's Site	Earthlodge village	Extended Coalescent

Cultural materials recovered from their excavation included a large quantity of ceramics, bone and stone tools, faunal remains, debitage and a number of perishable materials. The latter include remains of corn, beans, tipsin or prairie turnip root (Psoralea esculenta Marsh), a woven basket, wooden knife handle and a buckskin bag (Woolworth and Wood 1964:125) Identifiable faunal remains were represented by the following species: bison, deer, antelope, elk, canids, badger, rabbit, ground squirrel, catfish, turtles, white pelican, marsh hawk, American and ferruginous rough-leg hawks, crane and crow. Bison remains dominate this assemblage, however the variety of species present supports Lehmer's (1971:128) statement that "The Extended Coalescent settlement pattern of small villages occupied for only a short time may represent a response to marginal economic conditions, which in turn were the product of a less favorable climate."

The 1985 investigation at Demery documented that large quantities of ceramics, bone, burned rock, chipped stone tools and debitage are still present, occurring in an area measuring approximately 450 m north-south by 600 m east-west (see Figure 3 and Table 5). Two small elbow pipes were also observed (see Figure 4 a and b). These materials were observed on the beach of Lake Oahe as well as the heavily vegetated top of the terrace. The cultural materials occupy nearly the entire terrace which at low lake levels forms a large peninsula connected to the mainland by a narrow isthmus. Concentrations of bone, ceramics, lithic debitage and stone tools were more evident in the eastern portion of the site area which corresponds to the area investigated by Woolworth and Wood (1964). It is not known whether or not the observed concentrations are associated with lodge structures. Although wave action has eroded the margins of the site it is also responsible for depositing a layer of gravel on the eastern shoreline of the terrace. The gravel has, in effect, slowed the process of erosion. However, intact cultural deposits are still believed to be present as evidenced by the cultural material exposed in the numerous pits excavated by pot hunters.

The surface of the site has been heavily disturbed by pothunters, most of which skim the surface and screen the matrix for good artifacts. Piles of sand, gravel and discarded bone, ceramics, and other artifacts occur throughout the site area. Two collectors were encountered during our investigation and dissuaded from digging, however they continued to surface collect nonetheless.

The analysis of the surface collection of rim sherds indicates that most are attributable to the Extended Coalescent La Roche wares (see Figures 5 and 6 and Table 5). However a number of sherds are similar to the Middle Missouri Tradition Riggs and Fort Yates wares (see Figure 6a and Table 5). Woolworth and Wood (1964:104-105) also recovered Middle Missouri ceramics, however in fewer numbers. The Middle Missouri ceramics recovered during the 1985 investigation mainly occurred along the northern beaches, an area which was not intensively excavated by Woolworth and Wood (1964:Map 7). This suggests that a larger, spatially distinct Middle Missouri Tradition component may exist at the site than was shown by Woolworth and Wood's (1964) excavations.

The investigation of 39CO1 indicates that additional intact cultural deposits are highly likely. These deposits are attributable to both

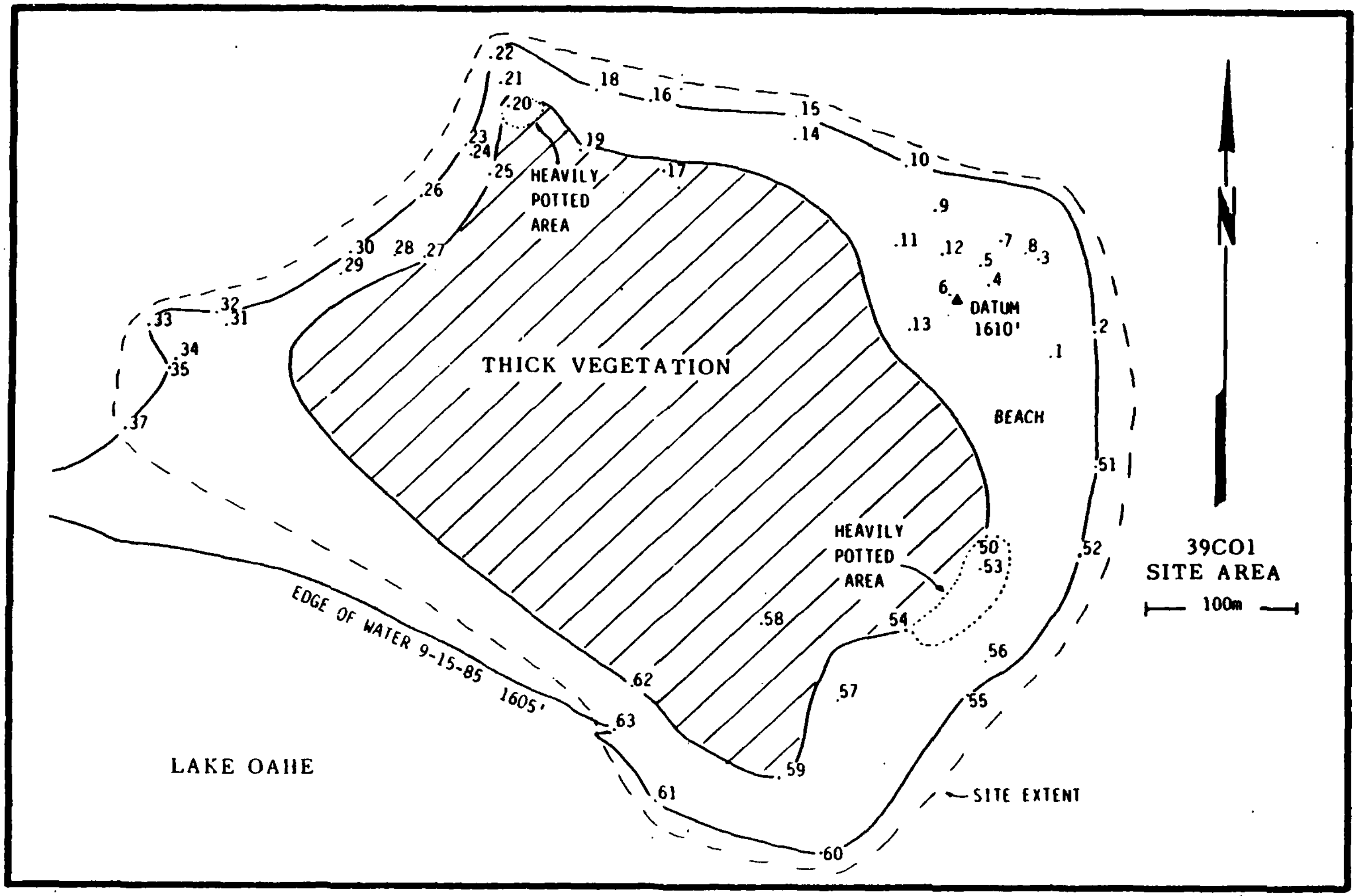

Figure 3. Map of 39CO1.

Table 5. Site 39CO1 map legend.

MAP #	DESCRIPTION	CATALOG NUMBER	COLLECTED ?
1	1 FIRE-CRACKED ROCK FCR concentration: 10m diameter area.		
2	EDGE OF WATER		
3	1 FAUNAL MATERIAL Bone concentration: à 300 frags. in 5m diameter area.		
4	1 RIM SHERD, , , SIZE GRADE 5 FORT YATES INCISED (c.f. SPERRY 1968:PLATE 8C) Tool incised.	86-19-1	I
5	1 RIM SHERD, , SMOOTH/PLAIN, SIZE GRADE 6 RIGGS PLAIN (c.f. SPERRY 1968:PLATE 6B)	86-19-2	I
6	3 RIM SHERDS 86-19-3 RIGGS PUNCTATE (c.f. SPERRY 1968:PLATE 6G) Tool impressed. 86-19-5 RIGGS FILLETED RIM (c.f. SPERRY 1968:PLATE 6K) 86-19-4 TALKING CROW STRAIGHT RIM (WOOLWORTH AND WOOD 1964:PLATE9j)	86-19-3-5	I
7	1 FAUNAL MATERIAL Bone concentration: à 50 frags. in 5m diameter area		
8	1 CHOPPER/CHOPPING TOOL/CORE TOOL, YELLOW/RED TONGUE RIVER SILICIFIED SEDIMENT, COMPLETE, SIZE GRADE 6		
8	1 CHOPPER/CHOPPING TOOL/CORE TOOL, MISC. AGATE/CHALCEDONY, COMPLETE, SIZE GRADE 6		
9	1 FAUNAL MATERIAL Bone concentration: à 50 frags. in 5m diameter area.		
10	1 FAUNAL MATERIAL Bone concentration: à 100 frags. in 5m diameter area.		
11	EDGE OF WATER		
12	1 FAUNAL MATERIAL Bone concentration: à 50 frags. in 2m diameter area.		
13	1 RIM SHERD, , SMOOTH/PLAIN, SIZE GRADE 5 RIGGS PUNCTATE (c.f. AHLER 1977:53-55)	86-19-7	I
13	2 RIM SHERDS, , , SIZE GRADE 4 RIGGS DECORATED LIP (c.f. LEHMER 1966:PLATE VI14) Tool incised.	86-19-8,9	I
13	1 RIM SHERD, , SMOOTH/PLAIN FORT YATES CORD IMPRESSED (c.f. SPERRY 1968:PLATE 7I) CORD impressed.	86-19-11	I
13	1 RIM SHERD, , , SIZE GRADE 5 FORT YATES CORD IMPRESSED (c.f. SPERRY 1968:PLATE 7J) Cord impressed.	86-19-14	I
13	2 RIM SHERDS, , SMOOTH/PLAIN, SIZE GRADE 5 RIGGS PLAIN (c.f. SPERRY 1968:PLATE 6B)	86-19-12,13	I

Table 5. Continued.

MAP #	DESCRIPTION		CATALOG NUMBER	COLLECTED ?
13	2 RIM SHERDS, , SMOOTH/PLAIN, SIZE GRADE 5 Tool impressed.	#10 - UNKNOWN #6 RIGGS PLAIN RIM (WOOD AND WOOLWORTH 1964:16)	86-19-6,10	X
14	10 RIM SHERDS 10 assorted rim sherds.		86-19-15 to 25	X
15	3 RIM SHERDS 1 BODY SHERD, POSSIBLY FORT YATES CORD IMPRESSED (86-19-26)	RIGGS DECORATED LIP (c.f. SPERRY 1968:PLATE 6D)	86-19-28	
16	EDGE OF WATER	LA ROCHE HORIZONTALLY INCISED - WHEELER VARIETY (HOFFMAN 1968:PLATE 11E)	86-19-27	
17	1 FIRE-CRACKED ROCK FCR concentration: 2m in diameter.			
18	EDGE OF WATER			
19	1 BONE TOOL, , FRAGMENT, SIZE GRADE 6 Scapula hoe.			
20	1 Pot-hunting disturbance à 30m in diameter.			
21	1 Cement post: possible excavation datum.			
22	1 FAUNAL MATERIAL E end of bone concentration; N side of site.			
23	1 CHOPPER/CHOPPING TOOL/CORE TOOL			
24	1 RIM SHERD, , , SIZE GRADE 4 Cord impressed.	FORT YATES CORD IMPRESSED (c.f. SPERRY 1968:PLATE 7J)	86-19-29	X
24	1 BONE TOOL, , , SIZE GRADE 6 Tool incised rib.		86-19-49	X
25	1 Top of beach.			
26	EDGE OF WATER			
27	3 RIM SHERDS	RIGGS FILLETED RIM (c.f. SPERRY 1968:PLATE 6I) LA ROCHE HORIZONTAL INCISED (c.f. HOFFMAN 1968:PLATE 13A) LAROCHE HORIZONTALLY INCISED (c.f. HOFFMAN 1968)	86-19-30 86-19-32 86-19-31	X
28	1 FIRE-CRACKED ROCK FCR concentration: 1m in diameter.			
29	1 FAUNAL MATERIAL N end of bone concentration: à 1000 frags. in 150m area.			

Table 5. Continued.

MAP #	DESCRIPTION	CATALOG NUMBER	COLLECTED ?
30	EDGE OF WATER		
31	1 FAUNAL MATERIAL Bone concentration: ± 10 frags. in 1m diameter area.		
32	EDGE OF WATER		
33	EDGE OF WATER		
34	1 FAUNAL MATERIAL Bone concentration: ± 12 frags. in 5m diameter area.		
35	EDGE OF WATER		
36	1 FAUNAL MATERIAL Bone concentration: ± 6 frags. in 1m diameter area.		
37	EDGE OF WATER		
50	6 RIM SHERDS At N edge of pot-hunting disturbance.	86-19-33 to 38	I
51	1 Top of beach		
52	1 Top of beach.		
53	1 N edge of pot-hunting disturbance.		
54	1 S edge of pot-hunting disturbance.		
55	1 Top of beach.		
56	1 BODY SHERD, , , SIZE GRADE 4 Tool incised; chevron pattern.		
57	1 BODY SHERD Tool incised; chevron pattern.		
58	1 Nonitemized pottery concentration.	86-19-39 to 48	I
59	1 2 pipes; 1 catlinite; 1 steatite.	86-19-50 86-19-51	I

Table 5. Continued.

MAP #	DESCRIPTION	CATALOG NUMBER	COLLECTED ?
60	1 Top of beach.		
60	1 PROJECTILE POINT, KNIFE RIVER FLINT, FRAGMENT, SIZE GRADE 4	86-19-52	X
61	1 Top of beach.		
62	1 Edge of weeds. AND PROJECTILF POINT	86-19-53	X
63	1 Top of beach.		

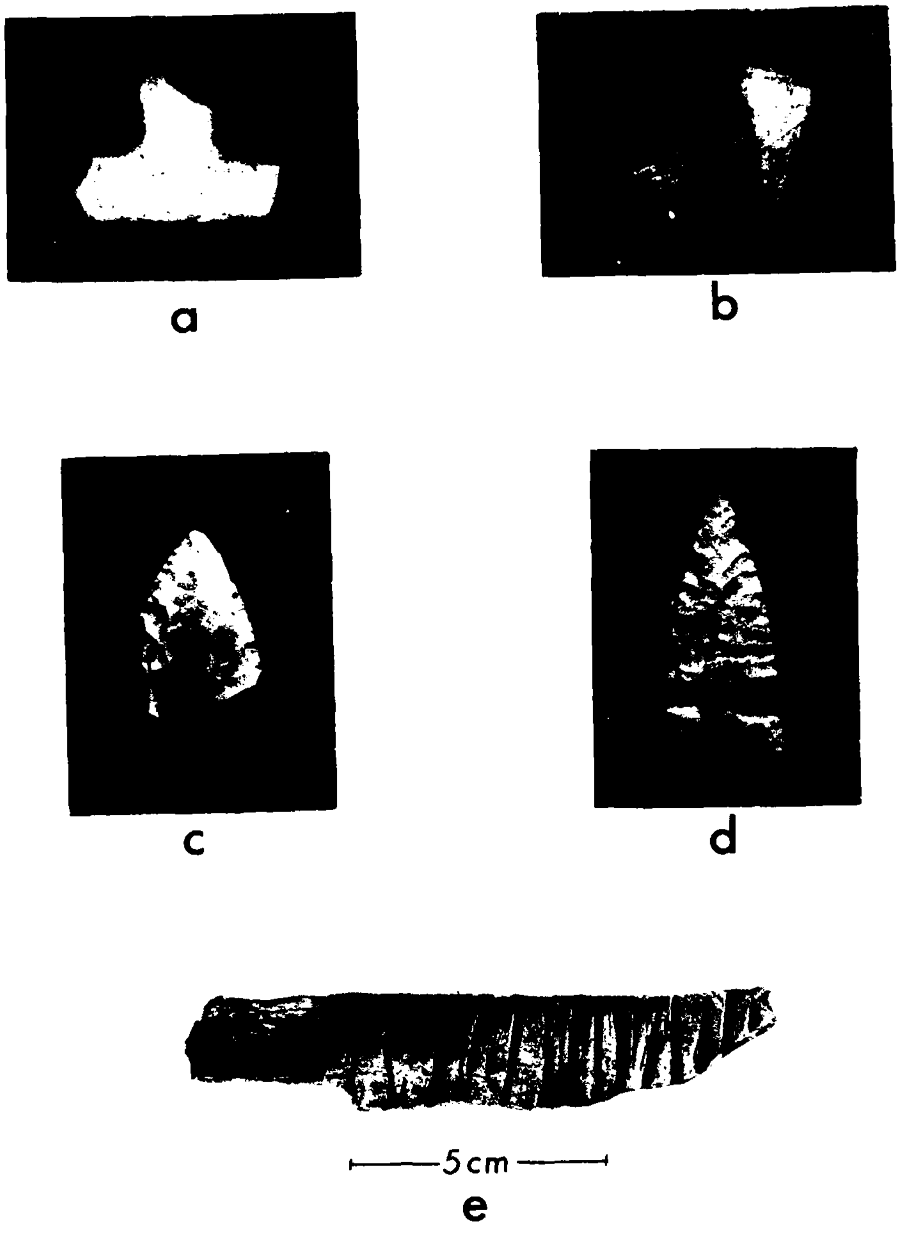

Figure 4. Artifacts from 39CO1: a-possible crude catlinite pipe fragment; b-unfinished steatite pipe; c-d-projectile points and e-incised rib. All artifacts except (e) are actual size.

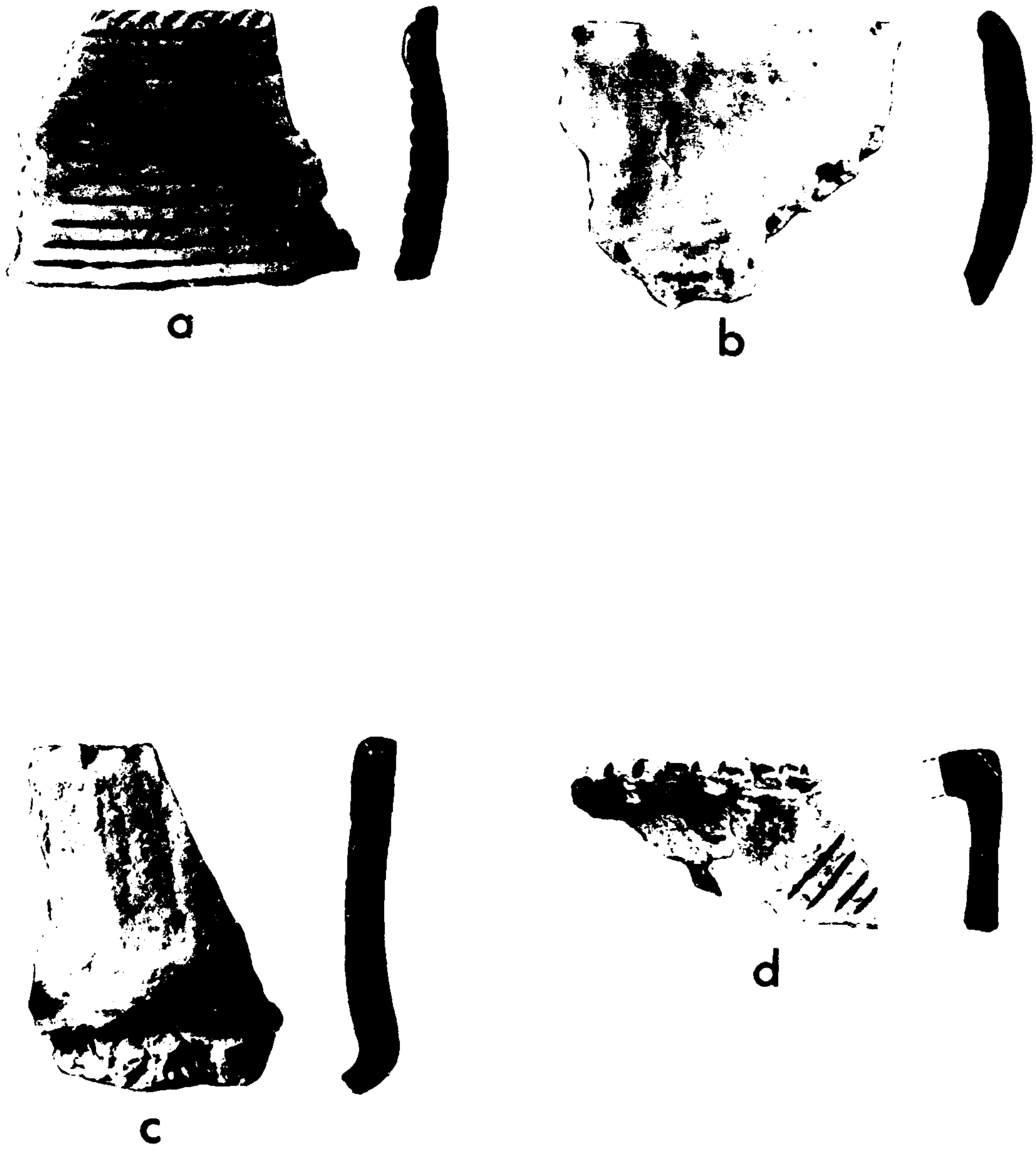

Figure 5. Rim sherds from 39CO1: a-possible La Roche Horizontal Incised Rim-Wheeler variety with fine stab and drag incisions; b-c-Talking Crow Straight Rim and d-unclassified. All sherds are actual size.

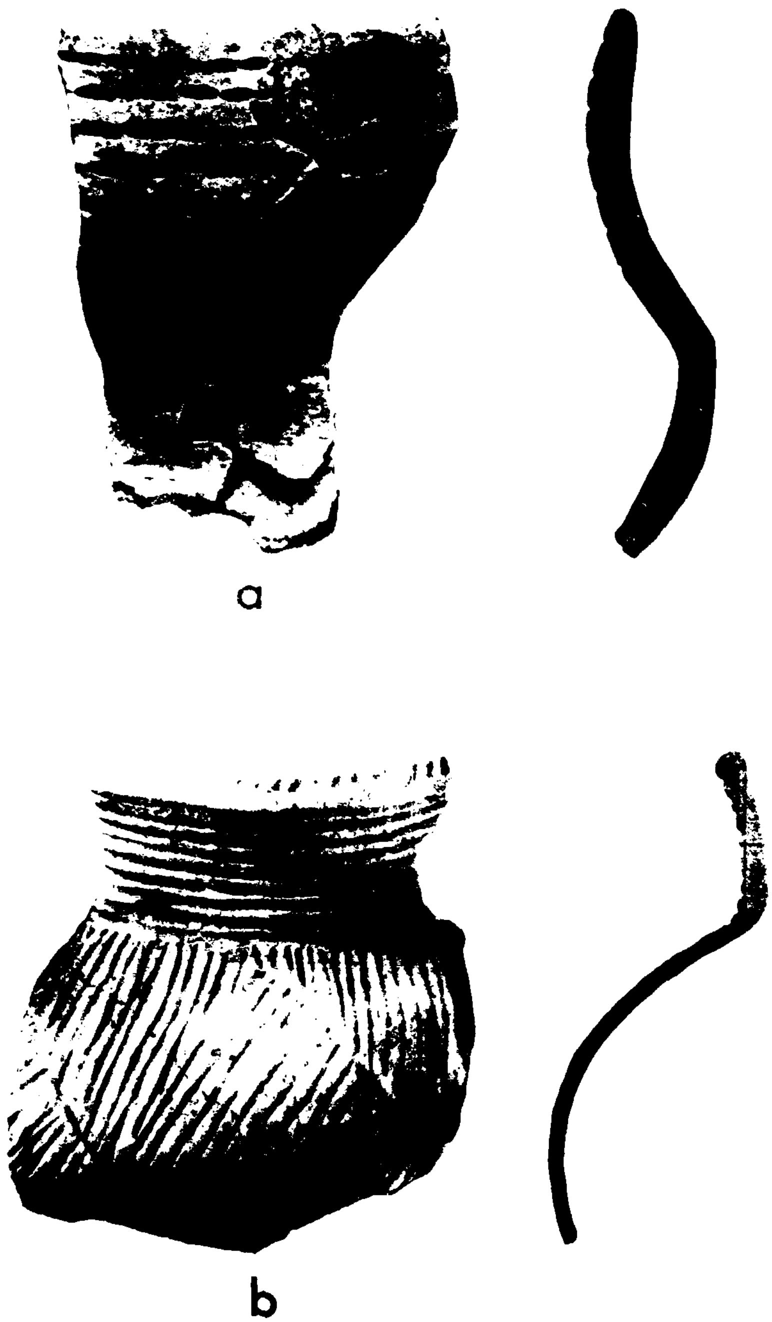

Figure 6. Rim sherds from 39C01: a-Fort Rice Trailed with stab and drag incisions and b-miniture vessel-La Roche Incised Straight Rim. Both sherds are actual size.

Extended Coalescent and Extended and/or Terminal Middle Missouri variant occupations. Test excavations are recommended in order to determine 1) the depth, extent, location, affiliation and contents of the suspected buried cultural deposits and 2) determine the effects of inundation and/or wave action upon the cultural deposits. The specific locations of any test excavations would have to be determined by the distribution of cultural material occurring at the time of the investigation. However due to the large site extent, backhoe trenches placed along the northern and eastern margins of the site (e.g., from Station 1 south to Map Point 54 and west from Station 1 to Map Point 19) may be the most efficient means of examining the site (see Figure 3). Test excavations could then be used to further investigate any features (i.e., cache pits, hearths, house floors, etc.) encountered within the trenches as well as addressing pertinent research topics and questions. Further investigation of this site can only be accomplished during Lake Oahe pool levels that are at 1600' or lower. Until the time that additional investigation can be accomplished, the site will continue to be impacted by inundation, wave action and pothunting.

The presence of additional intact cultural deposits and the unique position of this site in Middle Missouri prehistory as the northernmost expression of the Extended Coalescent variant attest to its significance. A number of research topics can be presented which relate to the site's geographic and chronological position. In addition to topics relating to subsistence, ceramic and radiocarbon analyses (see Buechler 1984:50-51), the primary topic concerns the relationship of this site to other contemporaneous villages in the area. The lack of fortifications at 39CO1 is especially interesting considering that most of the contemporary Terminal Middle Missouri villages were fortified. The general assumption is that at least some of that protection would have been necessary due to the expansion of Extended Coalescent populations into Middle Missouri Tradition territories. The activities occurring at 39CO1 may be critical in addressing such questions concerning cultural interaction and relationships during the Plains Village period. As a result, the site should be considered potentially eligible for nomination to the National Register of Historic Places.

39CO3:

The Kenel site consists of numerous historic occupations overlying an Extended Middle Missouri prehistoric earthlodge village (Lehmer 1971:67). Together these materials occur in an area measuring approximately 300 m north-south by 800 m east-west. Previous investigations by Will and Hecker (1944:86-87) present the following discussion:

> This Archaic Mandan site has been occupied by an Indian school, a farm school and a small Indian community during the past 50 or 60 years. Nothing shows on the surface but potsherds, pounded bones, flint spalls and artifacts. Any indications of lodge ruins have long since been obliterated. However, while digging in a lodge ruin for potsherds, we uncovered 9 feet of a lodge floor edge near the wall, showing three post holes about 2½ feet apart in a straight line, indicating rectangular type houses, as the floor edge was also straight for this distance and

did not extend beyond the post holes. This was the extent of our digging along that wall. We were unable to determine the size of this site with any degree of accuracy but potsherds etc. showed on 10 or 12 acres. Indian CCC workers while landscaping uncovered three burials. Two secondary disarticulated multiple group burials apparently interred by the original villagers and a later single burial of one man which was no doubt intrusive. This single burial was primary and several artifacts were recovered by the CCC workers. As the workers dug out this primary single burial and the Indian Agent at Fort Yates had taken the artifacts away before we arrived on the scene we know little about the burial. However, we stratified one of the group burials and took some photographs but as badgers had dug through the burial and the workers had disturbed the top we had very little to work on. This burial was packed in clay carried up from the river about 300 yards away. There were fragments of parts of 25 or more skeletons of persons ranging from those under six months old (as shown by jawbones with teeth uncut) to elderly people whose lost molar teeth cavities were grown over. Some of the adult bones were painted red with what appeared to be cinnabar. No grave goods were found in this burial but there were two sea shells that may have been intrusive through the badger holes. The skeletal fragments were apparently gathered up and thrown into the grave, as no order was observed in placing them. Evidently this group burial was made from bones fallen from scaffold burials. The second group burial was not packed in clay and the CCC workers had taken all the bones out before we arrived. However, Dan Eagle and Abe Roughsurface, two Indian boys who had been detailed to help us on the first group burial, stated that the second one was the same as the first. The potsherds at this site are Archaic Mandan types.

The 1952 Smithsonian Institution River Basin Surveys site form (see Volume 2, Appendix C) also notes that approximately 50 burials were found but their relationships to those noted by Will and Hecker (1944) is not known. However, it is possible that the two reports are referring to the same burials.

The present investigation located ceramics, bone and cache pits eroding out of the cutbank (see Figure 7 and Table 6). No cultural materials were found on the surface of the terrace due to the heavy vegetative cover but given Will and Hecker's (1944) report, intact buried cultural deposits are most likely still present.

Most of the cultural materials consist of a level of bone fragments exposed in the cutbank and occurring approximately 25-50 centimeters below the present ground surface (B.S.). Another intermittent layer of cut bone fragments and historic ceramics was also exposed in the cutbank between 10 and 15 centimeters B.S. This level is suspected to be associated with the

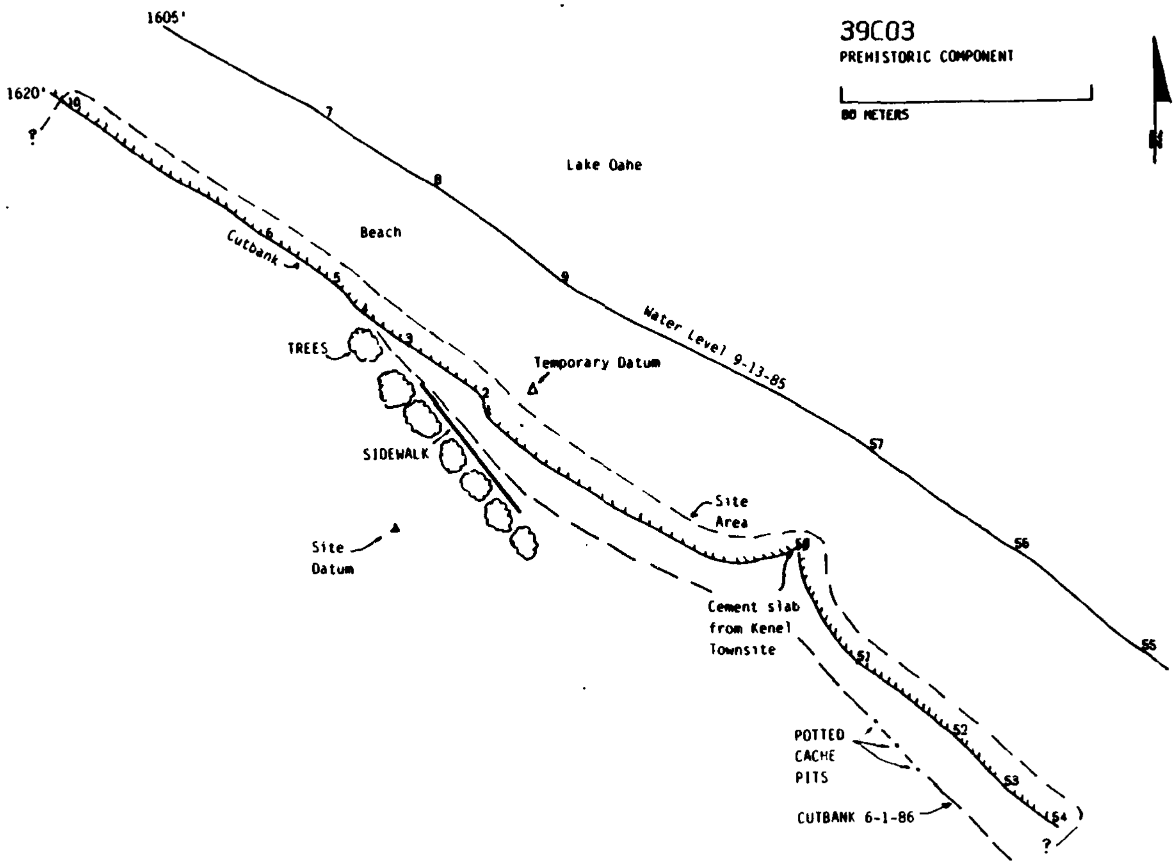

Figure 7. Map of 39C03, prehistoric component.

Table 6. Site 39CO3, prehistoric component map legend.

MAP #	DESCRIPTION	CATALOG NUMBER	COLLECTED ?
1	1 FAUNAL MATERIAL Bone concentration in cutbank: à 100 frags. à 1.5' below surface.		
2	1 FAUNAL MATERIAL Bone concentration in cutbank: à 50 frags. à 1.5' below surface.		
3	1 FAUNAL MATERIAL Bone concentration in cutbank: à 30 frags. à 1' below surface.		
4	CUTBANK		
5	1 FAUNAL MATERIAL Bone concentration in cutbank: à 150 frags. à 1' below surface.		
6	CUTBANK		
7	EDGE OF WATER		
8	EDGE OF WATER		
9	EDGE OF WATER		
10	1 HEARTH In cutbank; à 2' below surface.		
50	1 Old bridge.		
51	1 Pottery and bone in cutbank. RIGGS FILLETTED RIM? SPERRY (1968:40-41)	86-28-1	X
52	1 BIFACE In cutbank; pottery and bone present.	86-28-4	X
53	1 Pottery and bone in cutbank.		
54	1 FEATURE IN BANK #3 RIGGS PUNCTATE SPERRY (1968:40) Ash and charcoal stain in cutbank. #2 RIGGS FILLETTED RIM SPERRY (1968:40-41)	86-28-2-3	X
55	EDGE OF WATER		
56	EDGE OF WATER		
57	EDGE OF WATER		

early historic occupation of Kenel. Test excavations are necessary to define the chronological relationships between the two bone levels exposed in the cutbank and to define the extent and integrity of the Extended Middle Missouri village noted by Will and Hecker (1944:86). The prehistoric component can therefore be considered potentially eligible for the National Register of Historic Places.

The historic component at 39CO3 consists of the remains of St. Benedict's Mission and the Sioux town of Kenel. Mattison (1953:154) provides the following description:

> The historic component of 39CO3 consists of the remains of St. Benedict's Mission and the Sioux town of Kenel. The village of Kenel, located some 18 miles by river below Fort Yates...is a sub-issue station of Standing Rock Reservation. The town was named for Father Martin Kenel, a Benedictine priest who came there in 1884 and served for many years as the superintendent of the boarding school. The school has since been moved to Fort Yates. Kenel is a small Indian town. It has a traders' store which serves as a post office, a large Catholic Church, an older church which now serves as community hall, a large and active cemetery of 300 graves behind which there is a cluster of log Indian dwellings. In the churchyard is a monument to Bishop Martin Marty in the form of a shrine.
>
> The site of the Saint Benedict's Mission is located in Kenel. This mission was known for many years as the St. Benedict's Agricultural and Boarding School. It was established in 1878 by Bishop Marty. Rev. Henry Hug, O.S.G. and later Claude Ebner, both from Saint Meinrad, Spencer County, Indiana, were sent there to open a school for boys twelve years of age and older. Agent James McLaughlin, in 1879, reported as follows:
>
>> At the industrial farm school, now one year established, and located 15 miles south of the agency, are 15 boys, under the immediate charge of Rev. Mr. Hendricks, assisted by five lay brothers of the Benedictine Order, of Saint Meinrad, Spencer County, Indiana. The brothers are all mechanics and artisans, and are teaching the boys respective trades, as tailors, shoemakers, carpenters, and farmers....
>
> In 1882, a chapel, 25 X 75, was built at the farm school. The school made rapid progress under the Benedictine fathers. In 1884, Bishop Marty appealed to the Benedictine Abbey of Conception, Missouri, for co-laborers among the Sioux. As a result, Father Kenel and Bede Marty, O.S.B., were sent to St. Benedict's. Father Kenel served as superintendent after the Government took over the institution and converted it into a Government industrial school. Benedictine sisters also assisted him in his work. Later, girls were admitted to the school. They were given instructions in the various branches of housework, such as cooking, baking, washing, ironing, cutting and fitting garments, sewing, etc.
>
> Father Kenel retired in October 1906. The Government paid him a tribute on the day of his retirement by naming the school,

which he served as superintendent for so many years, as "The Martin Kenel Agricultural School." The sisters, not finding what they considered a worthy successor, resigned as a body soon after Father Kenel retired. The work was continued by lay employees of the Government until 1919, when the school was closed. Some of the buildings were wrecked and removed to Fort Yates.

The large church at Kenel appears to be of recent origin. Only one building associated with the old Government school now remains at Kenel.

The only standing structures present in 1985 consist of a stone grotto and a stone monument dedicated to bishops Martin Marty, who founded the mission, and Martin Kenel, for whom the town was named after (see Figures 8 and 9). The monument (Figure 8) is a tall four-sided pyramid with two projections at its apex resembling a tipi. The exterior is constructed of native rock, much of which contains fossils as well as two plaques honoring the two bishops. Mosaics of a cross, an American flag and various words also occur on the exterior. The inside of the monument is also covered with mosaics of words and figures. Deer flank both sides of an apparent altar above which are the words "IN EXCELSIS DEO". At the juncture of the four interior walls is an eye at the top of a pyramid similar to that found on a one dollar bill.

This structure was formerly enclosed by a fence with large round stone and mortar posts at the corners and an arch above the entrance (see Volume 2, Appendix C). These features are also constructed using various types of native stone.

The other standing structure occurs in an area shown on the 1947 Corps of Engineers War Department map (Sheet 118) as a cemetery. This 3 X 9 m structure is a stone re-construction of a grotto (Figure 9). Rocks were basically piled up arching inward until the two sides met at the middle forming what is known as a corbeled arch. This type of arch is a common construction technique among Native Americans as aboriginally they lacked the knowledge of the true arch (Hester 1976:390). The entrance is towards the southwest and the cemetery. The entryway goes approximately 1-1.5 m to the northeast, then turns sharply to the northwest leading to an apparent altar at the end of the grotto. An opening in the top of the structure permits light to shine onto the altar. The interior of the grotto is only approximately 1-1.5 m wide at the floor and narrow upwards, while the ceiling is 1.2-1.5 m above the floor. The floor slants downward to the altar, which is made of cement. The only inscription is present above the entrance in mosaic which reads "Momento Morll." The last word is not clear.

In addition to these standing structures, a number of foundations and depressions are present (see Figure 10). These represent the only remains of the St. Benedict Mission, its school and buildings of the local inhabitants. It is evident from the 1947 Corps of Engineers, War Department map that many more structures existed than were mapped in during the present investigation. However, most of the site area is covered with heavy vegetation obscuring many of these features. A layer of soil has also covered many of the foundations as evidenced by the fact that the only portion of foundations visible were exposed in holes. A buried level of

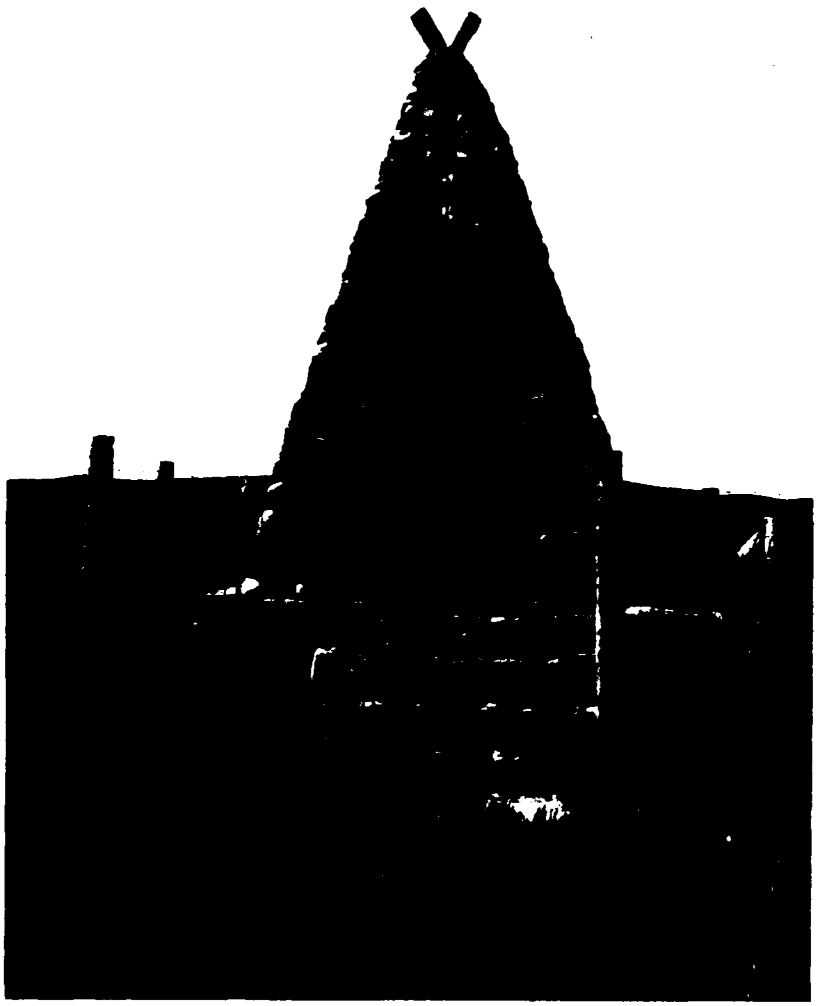

Figure 8. Site 39CO3, stone monument and memorial to Bishops Marty and Kenel.

Figure 9. Site 39C03, stone grotto.

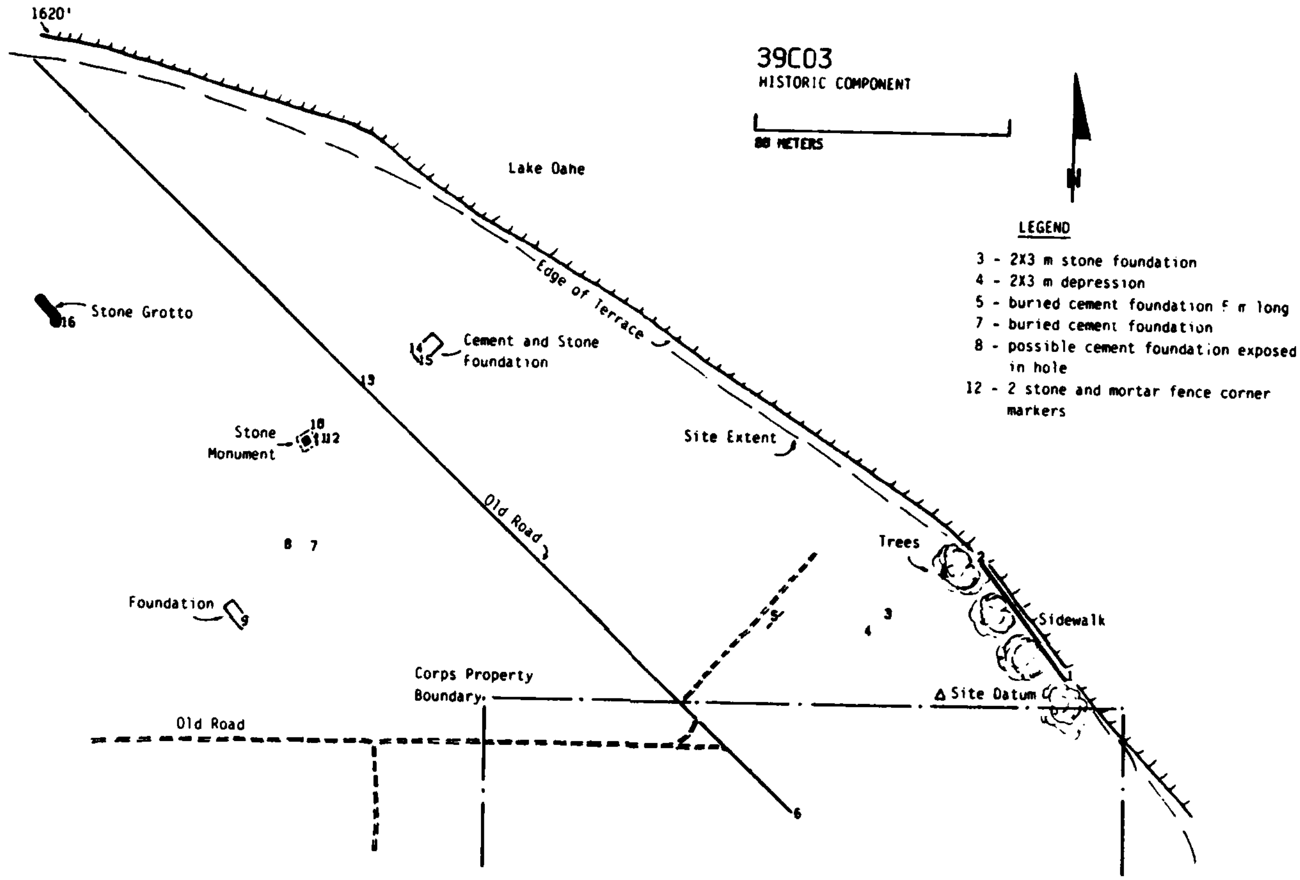

Figure 10. Map of 39C03, historic component.

cut bone and historic ceramics approximately 10-15 centimeters B.S. was also exposed in the cutbank in 1985.

As a result of the heavy vegetation and soil covering, only a portion of the site was mapped. A number of other surface features were observed but were not mapped in as their exact configuration or nature could not be determined. Any additional intensive surface investigation of the site should consider mowing or burning the vegetation. The only other features visible on the site are the old road beds, planted cottonwood trees and a sidewalk. The sidewalk and a number of trees were intact during the 1985 investigation of the prehistoric component, however record high lake levels has caused the migration of the cutbank approximately 5-10 meters. In June, 1986, the cutbank was at the edge of the sidewalk and erosion had also apparently caused the slumping of about half of the trees.

Although most of the former structures on the site have been removed or destroyed, in terms of religious importance, perhaps the most significant structures are still fairly well intact. These structures contain symbols which exhibit Native American and Euro-American influences. These symbols and the monuments themselves are evidence of a merger of Native and Euro-American belief systems which given the era (i.e., post-Indian War) is worthy of additional study.

The site is also notable in terms of the persons which occupied or visited the site. Although the chain-of-title search indicates that the land was issued as Patent Record No. 1 to the Bureau of Catholic Indian Mission on July 26, 1910, the site was occupied historically much earlier. The North Dakota Historical Quarterly (1931:181) mentions in their catalog of recent acquisitions:

> ...ebony crucifix given to Mad Bear by Bishop Marty; and brass crucifix and medal given to Bull Head, Sr. by Father De Smet, 1867, when he came up the Missouri River to what it [is] now known as Kennel, near the site of Fort Manuel Lisa [39CO5].

The historic component at this site is eligible for nomination to the National Register of Historic Places based on its potential to contribute to our understanding of the early reservation period and the dynamics of acculturation. Efforts should be made to protect the site from further damage as the result of cutbank erosion and flooding.

39CO5:

This site consists of the location of Fort Manuel, a historic trading post occupied in 1812-1813, an Extended Coalescent and possible prehistoric or protohistoric component and more recent debris from a 1900s historic Sioux farmstead. The site is situated on a narrow terrace near the confluence of Hunkpapa Creek and the Missouri River (see Figure 11). Most of the previous investigations have been concerned with the historic fort, which was extensively excavated by G. Hubert Smith in 1965 and 1966 (Smith and Ludwickson 1983). The fort is listed on the National Register of Historic Places.

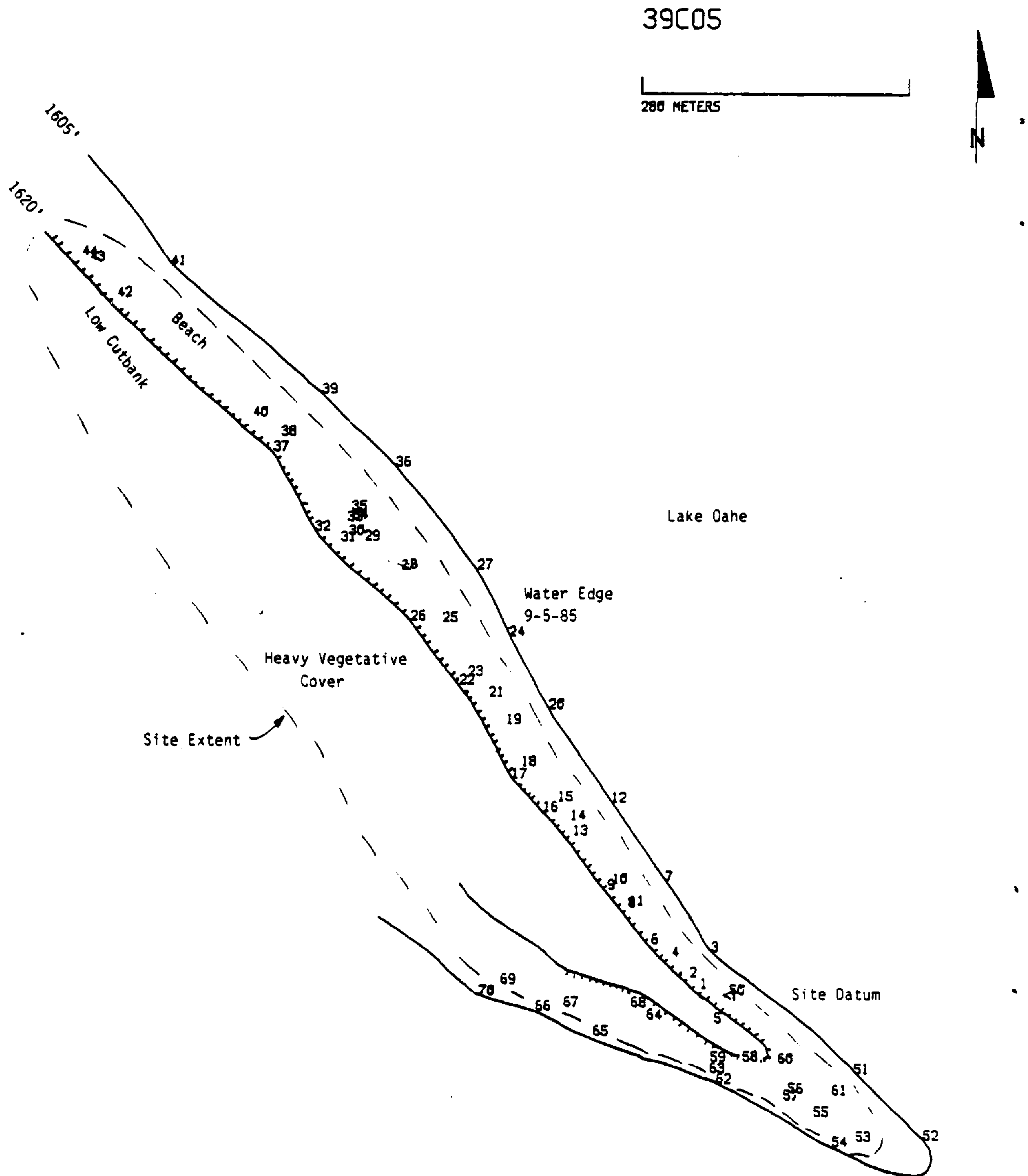

Figure 11. Map of 39CO5.

Except for brief descriptions by W.H. Over (Sigstad and Sigstad 1973:61) and William Duncan Strong (1940:376), George F. Will and Thad C. Hecker (1944:86) provided the first detailed description of the site.

> Manuel Lisa, a trader of Spanish blood, established a trading post at this site in 1812 and was burned out by the Sioux in 1813. The account of this post in *Luttig's Journal* is written by a clerk of the post. Luttig mentions earth lodge houses in his Journal and decadent type pottery can be picked up near the post ruins. Also good quality Arikara type potsherds are plentiful in the field and garden of Tom Pheasant, the present owner of the site. This good quality pottery indicates that an earlier Arikara village once occupied the area as the Arikara pottery of 1812 was of poor quality. Evidence of a village site shows on about 15 acres and the potsherds indicate the over-lapping of two sites. The surface has been under cultivation by Indians for about 50 years and little remains on the surface except a few potsherds, bones and flint spalls or artifacts. The United States Indian Bureau is restoring the old trading post and converting the area into a state park.

The site was assigned the Smithsonian number 39C05 by J. J. Bauxar (Smithsonian Institution - River Basin Surveys) in 1946 and latter visited by R. C. Farrell and J. J. Hoffman, also with the River Basin Surveys in 1951. Little information on the site was collected by these individuals (see Volume 2, Appendix C).

Excavations at the site were initially conducted by William Duncan Strong in 1938. The focus of the excavation was to recover the graves of the five individuals who died during the occupation of the fort (see Smith and Ludwickson 1983:6). Except for one recently looted grave and a brief examination of the stockade, no burials were located, although some prehistoric or protohistoric ceramics were found. Strong identified the ceramics as "definitely Cheyenne work" resembling the ceramics from the Biesterfeldt site (32RM1) (Smith and Ludwickson 1983:7).

In addition to Strong's archeological investigations, the Bureau of Indian Affairs reconstructed a facsimile of the stockade based on information derived from Strong's 1938 investigations. The work was conducted around 1941 with labor supplied by the Indian Emergency Conservation Work which was part of the Civilian Conservation Corps (Smith and Ludwickson 1983:7). Smith and Ludwickson (1983:7) go on to state that:

> Portions of the original stockade alignments of Fort Manuel were probably opened during and after Strong's brief visit by trenching to a shallow depth, and may have been left open in preparation for the reconstruction of 1941. Excavations at Fort Manuel in 1965 and 1966 revealed that the new construction lay outside the alignments of the original stockade, paralleling the old walls at a distance of approximately six feet, probably to avoid damage to the site, in large

> part still unexcavated. Fresh wooden stakes (2 by 2 inches and one foot long) were also found at irregular intervals along the course of the original alignments, undoubtedly survey stakes of about 1941, set as reference points for the "reconstruction."....
>
> The stockade structure of 1941 survived for only a few years (a photograph of this structure, captioned "The Re-habilitated Fort Manuel about 1940," can be found in Mattison 1954: 111). By May, 1952, most of it had collapsed or had been removed. When the site was next examined by the writer (June 1964) no part remained upright, the only visible remains were a few decaying sections that had been thrown over the edge of the terrace.

Except for the River Basin Surveys site recording discussed earlier, no intensive investigation of the site occurred until 1956 when W. Raymond Wood and Frederick Hadleigh-West excavated 12 test units. Eleven test units were placed along the stockade while one was located in a low mound of field stone (Smith and Ludwickson 1983:9-11). The excavation basically verified the location and integrity of Fort Manuel.

Major excavation of Fort Manuel was undertaken in 1965 and 1966 by G. H. Smith with the River Basin Surveys, for the purpose of "seeking fresh information that would supplement the surviving documentation for Fort Manuel" (Smith and Ludwickson 1983:13). For the purposes of this report a brief description of Smith's investigation is presented. The entire surface of the fort was stripped, revealing the stockade and the remains of seven buildings. In addition large areas to the east were also stripped with a mechanical scraper but "this deeper cutting revealed nothing of major archaeological interest" (Smith and Ludwickson 1983:13).

Descriptions of the fort and its contents are provided below.

> The ground plan of Fort Manuel, revealed by the excavations, had provided for an unobstructed work area approximately 100 feet square, bounded on three sides by the structures of the post. Aligned with these buildings, but not connected with them, a quadrilateral stockade composed of substantial whole-log pickets had enclosed the entire station. Measuring from opposite sides of the stockade, the post had been approximately 160 feet square. Specific evidence for other trading posts in the northern Plains, though limited, shows that Fort Manuel had been of medium size, and resembled the vast majority of the others in being quadrilateral. (Smith and Ludwickson 1983:71)
>
> Evidence of a second circular bastion was found at the intersection of the west and south sides of the stockade during 1966 (Plate 5b). This structure was probably similar to that in the opposite corner of the post but had been seriously damaged by two large disturbances which had destroyed portions of the trench. Evidence of the two circular bastions at opposing angles of the stockade enclosure does not seem to have been

observed during the brief archaeological investigations of 1938 or 1956.

Remains of seven buildings were found within the stockade. Each unit was lettered for reference (A-G) as it was exposed. Four of these units were dwellings (Structures A-C, E), one probably a storehouse (Structure D), one a blacksmith shop (Structure F), and one possibly a stable or barn (Structure G). It is not known whether the post had other buildings, although extensive stripping of the site failed to reveal more. Luttig's [1920] list of structures at the post does not tally exactly with the seven sites found by excavation and it may be incomplete. It seems unlikely that all physical evidence of any other structures had disappeared or was overlooked during the extensive machine and hand excavations. (Smith and Ludwickson 1983:13).

Only a small number of the artifacts recovered at the site of Fort Manuel were found in direct association with structural remains of 1812-13 or in occupational deposits of that period. Some other artifacts, though possibly used at the post and derived from that period had become separated from their original contexts. Still others, clearly of later origin, are probably casual discards of later visitors since there was no evidence of sustained use of the site after the post was abandoned by the Company. The artifactual evidence bearing on the period of special interest is even more restricted in its significance than is the structural evidence. This makes it difficult to reconstruct those parts of the material history of the station which lesser artifacts alone are likely to illuminate.

No major deposit of ordinary domestic refuse was found in any part of the site, within or beyond the lines of the stockade, despite the large size and coverage of the areas stripped and excavated. Although the party of 1812 was large, and although for that winter Fort Manuel was a major Company base, Luttig's journal shows that once essential construction was finished most of the expedition was ordinarily on duty elsewhere. By contrast, Indians were usually to be found at the fort, occasionally in large numbers and probably often in family groups. One winter day Luttig merely wrote: "plenty Rees at the fort" (Luttig 1920:114). The paucity of ordinary domestic refuse excavated, particularly food bone, is therefore noteworthy.

The total number of specimens and specimen lots from the northerly part of the enclosure (excavated entirely by hand) seems small, somewhat less than 400 catalog numbers having been assigned in the laboratory. The specimens themselves are small and fragmentary. Much the same is true of the somewhat smaller sample, approximately 200 in number, subsequently obtained from

> the southern portion of the site during the 1966 excavations. (Smith and Ludwickson 1983:76-77)

The recovered cultural materials consist primarily of various faunal remains and iron, wood and ceramic artifacts. A small amount of Native American artifacts were also recovered. These include chipped and groundstone tools, ceramics and various bone artifacts. The ceramics indicate that a number of components may be present. Smith and Ludwickson (1983:51) summarize these affiliations in the following discussion.

> A number of artifacts relating to aboriginal occupations of the Fort Manuel area were found in addition to the Euro-American specimens described above. Most items, with the exception of the Stanley Ware vessels, are presumed to be prehistoric. Two prehistoric components may be inferred from the presence of certain diagnostic artifacts.
>
> Earliest is a possible Middle Missouri Tradition component identified by at least one subsurface feature, a trash pit found eroding from the terrace edge, in 1968 by J.J. Hoffman and R.B. Johnston. The reason Hoffman and Johnston attributed this pit to the Middle Missouri Tradition may have been that a ground celt was found in it; no diagnostic ceramics were associated. It is conceivable that this celt may have found its way into a Coalescent or fort period context, and that in fact no Middle Missouri Tradition occupation of the terrace occurred. Further, such celts have been found in Extended Coalescent contexts (see below).
>
> A later Coalescent Tradition component is indicated (Lehmer 1971:194). This component is identified by the presence of distinctive ceramics with unthickened, curved to straight vertical rims with either horizontally incised lines, or plain rims with tool decorated lips, and "S"-rims, all of the "La Roche Pottery Tradition" (Stephenson 1971:51-61)...
>
> The presence of an "Arikara" pre-fort period Indian component in and around the site of Fort Manuel has been known since Will and Hecker's work (1944). In addition, Strong suggested that a Cheyenne component existed at the site (Strong 1940:376). These conclusions were drawn principally from the evidence of ceramics. The following material will not significantly alter interpretation of these Indian components since find-spots were never precisely recorded and spatial inferences regarding the various components is not possible.
>
> The Stanley Ware vessels may have originated either from the presence of Arikara at the fort or may have reached their discovery contexts through trade. Pottery diagnostic of the earlier Extended Coalescent horizon was also found and testifies to pre-fort occupations of the terrace. The general characteristics and type descriptions of the Coalescent pottery may be found in Stephenson's report on the Potts site, 39CO19

> (Stephenson 1971). The pottery from the Fort Manuel site differs in no significant way from that reported earlier.

It is evident from the previous investigations that at least two Native American components are present. While the historic Fort Manuel has been enrolled onto the National Register of Historic Places, the Native American components have yet to be sufficiently investigated for any similar determination.

The purpose of Larson-Tibesar Associates' 1985 investigation was to document the condition of the site and to collect sufficient information to determine the site's significance. The first part of the 1985 investigation focused on the condition or integrity of the site. Most of the cultural materials observed were found on the beach, suggesting little integrity. These materials were scattered over an area measuring approximately 1200 m north-south by 100 m east-west. A comparison of the location of Fort Manuel (Smith and Ludwickson 1983: Figure 2) to U.S. Army Corps of Engineers 1947 topographic maps (Sheet No. 118) and aerial photographs taken in October 2, 1981 (No 153 09 10 117) indicates that much, if not all, of Fort Manuel has been destroyed. This is verified by the fact that no artifacts which could be positively associated with the fort were observed on the beach. The presence of numerous and widespread Native American cultural materials along the edges of the terrace suggest that at least some portion of a prehistoric or protohistoric component(s) may still be present (see Figure 12). However, test excavations along the intact portion of the terrace adjacent to concentrations of prehistoric cultural materials would be necessary to define such a component(s). Collected ceramics are comparable to La Roche and Talking Crow wares (see e.g., Figure 12a-c) and are indicative of an Extended and probable Post-Contact Coalescent component.

In addition to the components discussed above, a historic 1900s occupation also occurred at the site. Smith and Ludwickson (1983:9) note that:

> Near the site of the post the sites of two of these allotment dwellings (removed about 1941) were marked by foundations of concrete aggregate. A hewn log building is shown in one of Carlyle Smith's photographs of the site (Plate 2a). Following the removal of these buildings and the relocation of the allottees who had used them, the site of Fort Manuel sustained some minor damage, and the excavations exposed several shallow refuse-filled pits of quite recent origin.

All of the historic debris observed during the 1985 investigation is related to this occupation. All of the cultural material was located on the bench and included the remains of the concrete foundation, bottle glass, bricks, farm machinery parts, ceramics and other domestic items.

Although Smith and Ludwickson noted above that Tom Pheasant occupied the site, this individual is not listed in the chain of title search. The chain of title search indicates that this location was issued as part of a Trust Patent allotment to Mrs. Mary Iron Horn in October 3, 1907. She died in February 10, 1929 and left the land to Maggie Shoot the Bear, who left

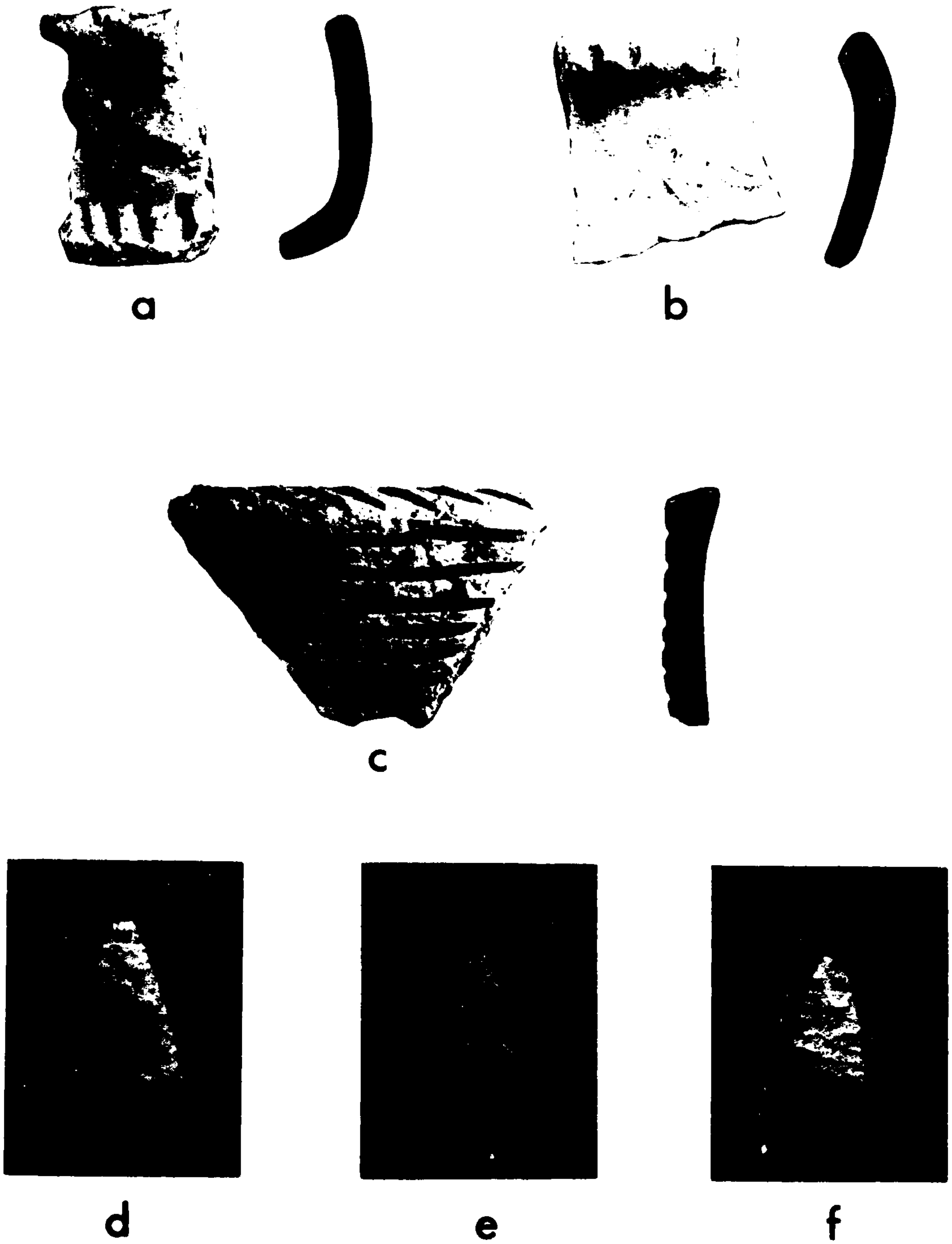

Figure 12. Artifacts from site 39CO5: a-b-Talking Crow Straight Rim; c-La Roche Incised Straight Rim and d-f-small corner and side notched projectile points (actual size).

it to Maurice Shoot the Bear in February 1, 1939. He died in August 3, 1941 and left it to Guy (Garfield) Shoot the Bear who held it until acquired by the U. S. Government in 1958.

This latter historic occupation is also believed to have been destroyed by erosion from Lake Oahe since the foundations noted by Smith and Ludwickson (1983) above were found scattered along the beach in 1985. This component therefore lacks any integrity and should not be considered eligible for the National Register of Historic Places.

As noted above, erosion has also destroyed the physical remains of Fort Manuel. As a consequence the information content and significance of this site involves archival records and data gathered by the previous archeological investigations. No further archeological investigation of the fort is therefore recommended.

Additional work is recommended, however, for the Plains Village component since a considerable amount of prehistoric cultural material is apparently eroding out of the terrace. Large concentrations of bone, flakes, ceramics and burned rock are present on the eastern edge of the terrace. Most of the materials coincide with areas of dark soil which is the most likely source of the cultural materials. Both Extended and Post-Contact Coalescent materials have been recovered from the site indicating that this location has had numerous occupations. The Plains Village component is also aparently unfortified and in that respect may be related to 39CO1, located approximately five miles to the northwest. Test excavations are recommended to determine the presence or absence of buried cultural levels, site extent and characteristics of the Coalescent components, and possible relationships to the Extended Coalescent occupation at 39CO1. This component is therefore considered potentially eligible for nomination to the National Register of Historic Places.

39CO6:

The Jake White Bull site is a fortified Extended Middle Missouri earthlodge village situated on an east-facing slope above the Missouri River. The site has been extensively eroded by wave action as will become apparent in the following discussion. The site is listed on the National Register of Historic Places.

Although a brief mention of an Archaic Jake White Bull site designated 39CO41 and equivalent to 39CO6 was initially made by W. H. Over (Sigstad and Sigstad 1973:61), most of the information concerning the site was provided during the Smithsonian Institution-River Basin Surveys. Paul L. Cooper assigned the number, 39CO6, to a fortified village, based on aerial photographs, which he believed to be the same as Over's Jake White Bull site (see Volume 2 - Appendix C).

The site was not visited until July 30, 1966 when it was investigated by J. J. Hoffman and Donald J. Lehmer. Hoffman (see Volume 2, Appendix C) reported that:

> Site appears to be fortified in a generally rectangular pattern. A broad, shallow ditch surrounds the occupation and is marked by corner bastions as well

as one center bastion along the north-south sweep of the ditch. This latter feature is located on top of a small knoll that rises off the west side of the site. Approximately 30 house pits are within the fortified area. None are noted outside. The pits are large ovals oriented NE-SW. They are more or less regularly arranged in 3 or 4 rows that parallel the long axis of the ditch. Some house pits are dug into the east face of the small knoll previously mentioned. The east side of the village has been badly eroded by rising waters, but little or no trash is washing out. The north-south sweep or western side of the ditch was chained and found to be 962.0' long. The present width of the village measured east-west thru the large bastion on the knoll, is 525.0'. This is only a minimal width as the east part of the site is presently cut by the reservoir. The entire village is positioned on a slope facing east. The elevation runs from 1590.0' to about 1630.0'.

Ahler (1977a:13) notes that:

> The site was again visited by a party of three under the direction of F. A. Calabrese of the National Park Service Midwest Archeological Center on 25 June 1972. It was then noted that an estimated two thirds of the site were under water, with only two rows of house depressions remaining above water. No high erosional cutbank has developed, but it was noted that local artifact collectors often visited the site to pick up eroded cultural material. Following that visit, Calabrese recommended a test excavation program to determine the cultural content of the site, the number of components represented, and the nature of the architectural features represented....
>
> In 1975 the Jake White Bull site was specifically brought to the attention of this author by Marion Travis of Mobridge, South Dakota, who for some time had been noting the continuing destruction of the site by reservoir wave action. Such destruction was greatly accelerated during the summer of 1975 when the Oahe Reservoir reached a maximum pool elevation of 1617.9 ft MSL. Travis, a conscientious lay archeologist, had for several years been making surface collections at the eroding site, and had urged several archeologists to take note of the impending destruction of the site. An examination of Travis' collection from the site, taken in conjunction with Lehmer's taxonomic classification and the new information from the Helb site, underscored the need to evaluate the importance, cultural content, and condition of the site, and led directly to the recommendations that the Corps of Engineers place the site high on a list of priorities for immediate attention.

This concern resulted in a systematic surface collection and test excavation of the site by Stanley A. Ahler with the University of North Dakota in 1976. Their investigation recorded eleven suspected house depressions of which only eight were complete (see Ahler 1977a:Figure 3). Test excavations were conducted in House 4 which was partially exposed in the cutbank. Profiles of the fortification ditch were also completed.

The test excavation resulted in the uncovering of 18 features consisting of numerous post molds and small and large subfloor pits (Ahler 1977a:32-34). In addition to the features large quantities of cultural materials were also recovered. Generally these include chipped and ground stone tools, lithic debitage, modified and unmodified bone, floral remains, shell, ceramics and fire-cracked rock.

Ahler (1977a:50) states that "all but 4% of the Jake White Bull vessel collection can be classified into either Riggs Ware or Fort Yates ware, two well recognized and easily distinguishable ceramic groupings common to Extended Middle Missouri variant sites in the Cannonball region of the Middle Missouri subarea".

As a result, Lehmer's (1971:121-122) assignment of the Jake White Bull site to the Terminal Middle Missouri based on the presence of a fortification ditch is incorrect (Ahler 1977:145). A radiocarbon date of A.D. 1013 + 43 was averaged from four samples following Long and Rippeteau and calibrated from dendochronological data (Damon et al. 1974). Given this information, Ahler (1977:130) concludes that this "computed early date of occupation would make the Jake White Bull site the earliest dated site occupied by Extended Middle Missouri peoples north of the Grand River, and perhaps one of the earliest such occupations in the entire Middle Missouri subarea (cf. Thiessen 1977)."

Impacts to the site have been considerable. Ahler (1977a:149) states that:

> Data from early field notes at Jake White Bull indicate that about 200 ft of the site and about 75% of the total site area have been destroyed since 1966, and there is no reason to think that a similar rate of erosion will not continue to occur under normal reservoir operating conditions.

The present investigation in September, 1985 by Larson-Tibesar Associates verifies Ahler's prophetic statement. Figure 13 is an overlay of Ahler's (1977:Figure 5) with our site mapping which shows a continuation of erosion due to the wave action from Lake Oahe. Up to twenty meters of the site has been destroyed since Ahler's (1977) investigation in 1976, leaving only six earthlodges relatively intact. Additional disturbances from pothunting has further destroyed portions of the site, especially cache pits or other features exposed in the cutbanks (see Figure 13 and Table 7. A revisitation to the site in June, 1986 indicated that the cutbank had been eroded as much as ten meters during the one year interval. Intact portions of the village presently measure approximately 290 m north-south by 90 m east-west. The erosion was due to the record high water level of Lake Oahe during the winter and spring of 1986. Pool levels above 1610 feet AMSL will continue to erode this site.

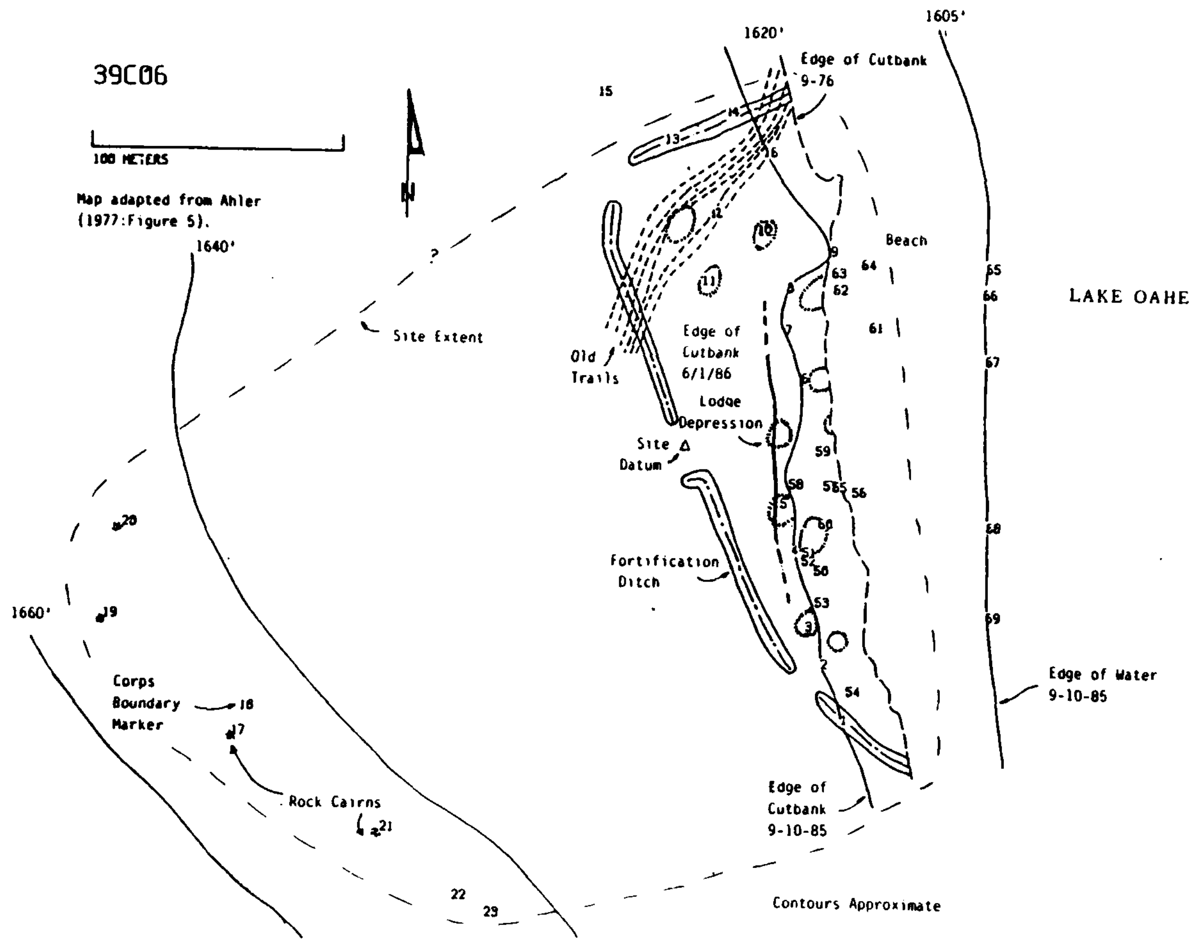

Figure 13. Map of 39C06.

Table 7. Site 39C06, map legend.

MAP #	DESCRIPTION	CATALOG NUMBER	COLLECTED ?
1	1 DEPRESSION Feature 1; bone in cutbank.		
2	CUTBANK Pot-hunting disturbance in wall.		
3	1 DEPRESSION Feature 2: 14m N-S.		
4	CUTBANK Old datum stake present.		
5	1 DEPRESSION Feature 3: 13m N-S.		
6	CUTBANK Broken bison skull on beach.		
7	1 DEPRESSION Feature 4: 18m N-S.		
8	CUTBANK Ceramics in cutbank wall.		
9	1 DEPRESSION Feature 5: 18m N-S.		
10	1 DEPRESSION Feature 6: 12m N-S.		
11	1 DEPRESSION Feature 7: 15m N-S.		
12	1 DITCH 6 ditches running NE-SW.		
13	1 DITCH W edge.		
14	1 DITCH E edge.		
15	1 Historic trash scatter.		
16	CUTBANK Bone and fcr in cutbank wall.		
17	1 MOUND Feature 8: disturbed by pot-hunting.		
18	FENCE Corps of Engineers boundary.		

Table 7. Continued.

MAP #	DESCRIPTION	CATALOG NUMBER	COLLECTED ?
19	1 MOUND Feature 9: disturbed by pot-hunting.		
20	1 MOUND Feature 10: disturbed by pot-hunting.		
21	1 MOUND Feature 11: disturbed by pot-hunting.		
22	1 Pot-hunting disturbance.		
23	1 Old excavation unit.		
50	1 RIM SHERD, , SMOOTH/PLAIN, SIZE GRADE 5 Tool incised. FORT YATES INCISED (CF LEHMER 1966:PLATE VIII e)	86-21-1	X
51	1 RIM SHERD, , SMOOTH/PLAIN, SIZE GRADE 5 Tool incised. RIGGS DECORATED LIP (CF AHLER 1977:FIG 14 h)	86-21-2	X
52	1 RIM SHERD, , SMOOTH/PLAIN, SIZE GRADE 5 Tool impressed. RIGGS DECORATED LIP (CF LEHMER 1966:PLATE VII 4)	86-21-3	X
53	1 FIRE-CRACKED ROCK ≥ 300 pieces in 5m diameter area.		
54	1 RIM SHERD, , SMOOTH/PLAIN, SIZE GRADE 4 Tool impressed. RIGGS DECORATED LIP (CF AHLER 1977:FIG 14i)	86-21-4	X
55	1 RIM SHERD, , SMOOTH/PLAIN, SIZE GRADE 5 Tool impressed. RIGGS DECORATED LIP (CF AHLER 1977:FIG 14h)	86-21-5	X
56	1 RIM SHERD, , SMOOTH/PLAIN, SIZE GRADE 6 Tool impressed. RIGGS DECORATED LIP (CF LEHMER 1966:PLATE VII 4)	86-21-6	X
56	2 RIM SHERDS, , SMOOTH/PLAIN, SIZE GRADE 5 RIGGS PLAIN (CF AHLER 1977:FIG 14d)	86-21-7,8	X
57	1 RIM SHERD, , SMOOTH/PLAIN, SIZE GRADE 4 Tool impressed. RIGGS DECORATED LIP (CF LEHMER 1966:PLATE VII 4)	86-21-9	X
58	1 BONE TOOL, , FRAGMENT, SIZE GRADE 6 Scapula hoe.		
59	1 BODY SHERD, , SMOOTH/PLAIN, SIZE GRADE 4		
59	1 RIM SHERD, , SMOOTH/PLAIN, SIZE GRADE 4 RIGGS PLAIN (CF AHLER 1977:FIG 14d)	86-21-10	X
59	1 RIM SHERD, , SMOOTH/PLAIN, SIZE GRADE 5 Tool impressed. RIGGS DECORATED LIP (CF LEHMER 1966:PLATE VII 4)	86-21-11	X

Table 7. Continued.

MAP #	DESCRIPTION	CATALOG NUMBER	COLLECTED ?
60	1 RIM SHERD, , SMOOTH/PLAIN, SIZE GRADE 4 Tool impressed. RIGGS DECORATED LIP (CF LEHMER 1966:PLATE VII 4)	86-21-12	Y
61	1 BONE TOOL, , FRAGMENT, SIZE GRADE 6 Scapula hoe.	86-21-15	Y
62	1 RIM SHERD, , SMOOTH/PLAIN, SIZE GRADE 5 RIGGS DECORATED LIP (CF LEHMER 1966:PLATE VII 4)	86-21-13	Y
62	1 RIM SHERD, , SMOOTH/PLAIN, SIZE GRADE 4 FORT YATES PLAIN? (CF AHLER 1977:FIG 15f)	86-21-14	Y
63	1 BONE TOOL, , FRAGMENT, SIZE GRADE 6 Scapula hoe.	86-21-16	Y
64	1 FIRE-CRACKED ROCK ± 500 pieces in 20m diameter area.		
65	1 FAUNAL MATERIAL Bone concentration: ± 400 frags. in 30m diameter area.		
66	EDGE OF WATER		
67	EDGE OF WATER		

Cultural materials recorded during the 1985 investigation consist of a few depressions, potted cache pits exposed in the cutbank and concentrations of fire-cracked rock, bone, ceramic and chipped stone tools and debitage on the beach (see Table 7). Two large concentrations of fire-cracked rock and other cultural materials may represent the remains of earthlodges. Collected ceramics are comparable to Ahler's (1977a) Riggs and Fort Yates wares (see Table 7). A series of small rock cairns occur to the west of the fortification ditch and may be associated with the village occupation. Test excavations would be necessary to determine the nature and cultural affiliation of these rock features.

Due to the rapid erosion, the present investigation strongly recommends that some preservative or mitigative action be taken before this National Register property is entirely destroyed.

39CO9:

The Leavenworth site is a historic fortified Arikara village and cemetery along both banks of Elk or Cottonwood Creek, a small tributary of the Missouri River. The site is also known as the Lewis and Clark site (39CO44) (Will and Hecker 1944:85). Extensive excavations of the village site were conducted in 1960-1962 by Richard Krause (1972) and the cemetery areas by William Bass (Bass et al. 1971). Both reports have lengthy descriptions of previous investigations at the various areas of the site. The cemetery area is the main concern of the present investigation since the village area is well below the 1605 foot water level. Table 8 adapted from Bass et al. (1971:Table 1) summarizes the previous investigations conducted at the cemetery areas.

Table 8. A list of individuals known to have excavated human burials from the Leavenworth site (39CO9).

Name	Reference	Affiliation	Date of Excavation	No. Burials Recovered
Maximilian, Prince of Wied	Thwaites (1906:86-87, Vol. III)		April, 1834	2
W.H. Over	Sigstad and Sigstad (1973: 43-50)	Univ. of S. Dakota	August, 1915, July, 1917	4 11
M.W. Stirling	Wedel (1955: 96-102)	Smithsonian Institution	June, 1923	33
W.D. Strong	Notes, pp. 72-73	Smithsonian Institution	August, 1932	4
J.B. Caldwell	Notes, pp. 4-10	Amateur	October, 1935	4(?)
W.M. Bass	Bass et al. (1971)	Univ. of Kansas	1965-66	285
			TOTAL	343

W. M. Bass' excavation of the cemetery areas was aided by the use of mechanical equipment which stripped the topsoil until the burial pits were outlined; a technique which was obviously quite productive. The two cemetery areas are located on low hills on either side of Elk Creek and north of the main village. The areas excavated by W. H. Bass are still evident and also show up on aerial photographs. The excavated areas were mapped during the present investigation and compared to similar figures published in Bass et al. (1971:Figures 6 and 31). Figures 14 and 15 and Tables 9 and 10 show these comparisons and indicate the advancing erosion due to wave action. Based on the excavations, observed cultural material and the local topography, the potential site area of the western burial area is estimated at 200 m east-west by 150 m north-south and 350 m east-west by 150 m north-south for the eastern burial area. Observed cultural materials include a bear claw, large biface, bison bone and a possible unfused human femur (see Figure 15 and Table 10).

Although Bass et al. (1971:15) believed that almost all of the burials present had been recovered, the figures show large areas which were not excavated which could have the potential to contain additional historic Arikara burials. The recovery of one burial exposed by reservoir erosion in 1969 (Bass et al. 1971:20) would attest to this potential.

In addition to the burials a small number of Extended Coalescent variant earthlodges occur in the east burial area (see Figure 15). "During the 1966 field season our crew, directed by Dr. Donald J. Lehmer, spent one week excavating one complete house and parts of two others that were found in the eastern end of Feature 102-202" (Bass et al. 1971:11). Although Bass et al. (1971:11) note that "Dr. Lehmer and Mr. Nick Franke have submitted their report, The Highland Leavenworth Site to Plains Anthropologist for consideration", no report has ever been submitted. An unpublished version of this report provides the following description:

> Surface indications and excavations in the Highland component showed that it consisted of about a dozen rather crude circular houses with central firepits and enclosed entrance passages. There were no indications that the settlement was fortified. The artifact sample recovered was small, indicating a brief occupation.
>
> House type, village plan and location, pottery, and other artifacts combine to indicate that the Highland Leavenworth Site is a component of the Extended Variant of the Coalescent Tradition. It obviously differs from the villages of the LeCompte Phase with their fortified centers, and probably followed them in time. Although there are some differences in pottery, there seems to be a close correspondence with the unfortified Extended Coalescent sites in the vicinity of the mouth of the Bad River in central South Dakota (Franke n.d.:1)

Speculations on the function of this small village are summarized by Franke (n.d.:13) and provide an assessment of its research potential.

> If it is assumed that settlement location is governed by the desire to make the most efficient use of the resources of an area, the situation of the Highland Leavenworth Site indicates

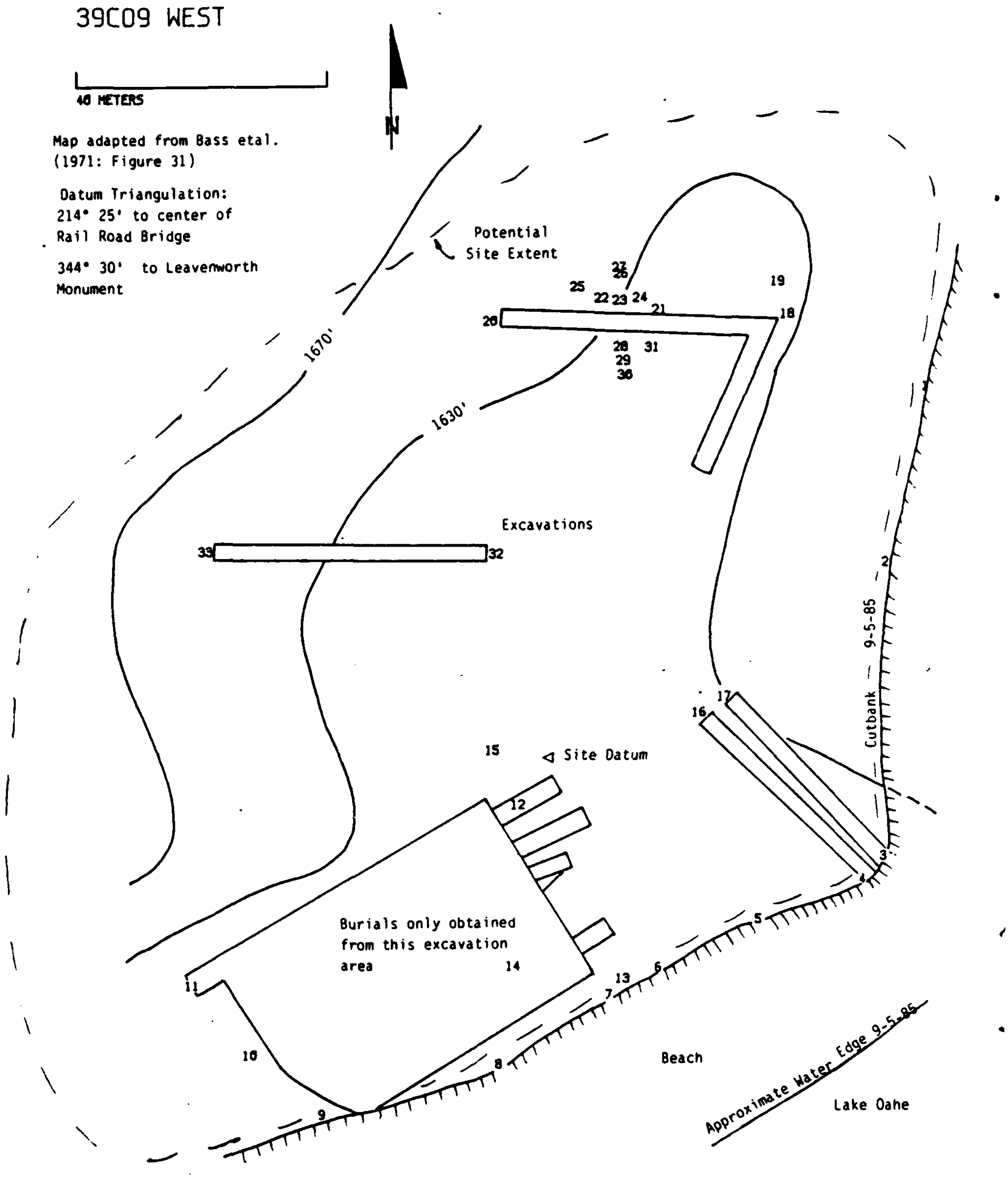

Figure 14. Map of 39C09, western burial area.

Table 9. Site 39C09, western burial area map legend.

MAP #	DESCRIPTION
1	CUTBANK
2	CUTBANK
3	CUTBANK Trench.
4	1 Trench.
5	CUTBANK
6	CUTBANK
7	CUTBANK
8	CUTBANK
9	CUTBANK Trench.
10	1 Site boundary.
11	1 Trench.
12	1 Trench.
13	1 Trench.
14	1 Anthill with beads.
15	1 Pot-hunting disturbance.
16	1 Trench.
17	1 Trench.
18	1 Trench.
19	1 Trench.
20	1 Trench.
21	1 Square trench.
22	1 Square trench.
23	1 Square trench.
24	1 Square trench.
25	1 Square trench.
26	1 Square trench.
27	1 Square trench.
28	1 Square trench.
29	1 Suare trench.
30	1 Square trench.
31	1 Square trench.
32	1 Trench.
33	1 Trench.

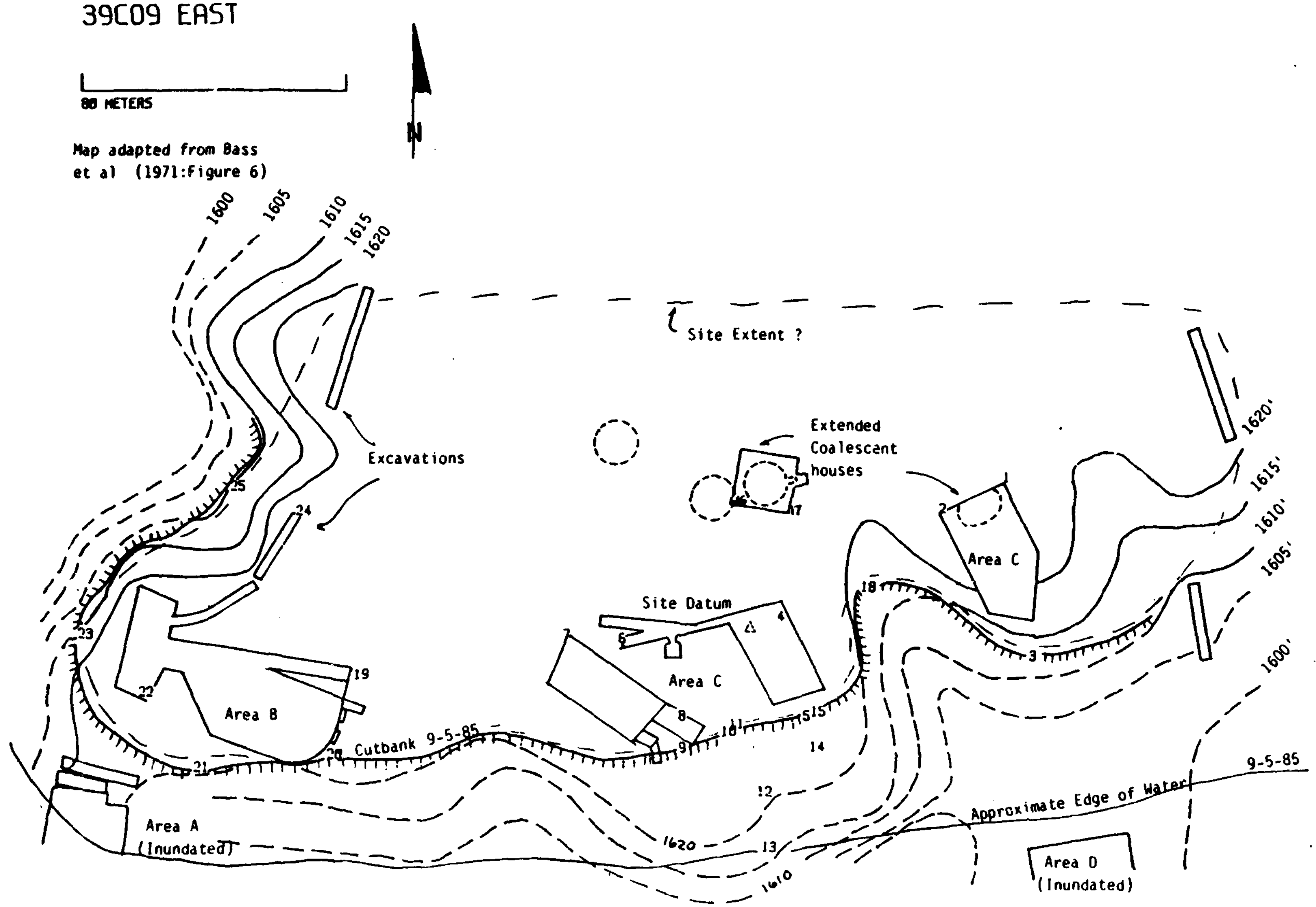

Figure 15. Map of 39C09, eastern burial area.

Table 10. Site 39CO9, east burial area map legend.

MAP #	DESCRIPTION	CATALOG NUMBER	COLLECTED ?
1	1 NE corner Feature 213 Area C.		
2	1 NW corner Feature 213 Area C.		
3	CUTBANK S of Feature 213 Area C.		
4	1 NE corner Feature 202 Area C.		
5	CUTBANK S of Feature 202 Area C.		
6	1 Trench off of Feature 202 N end.		
7	1 NE corner Features 102 and 202.		
8	1 SE corner Features 102 and 202.		
9	CUTBANK S of Features 102 and 202.		
10	1 FAUNAL MATERIAL Bison bone in cutbank: à 50cm below surface.		
11	1 FAUNAL MATERIAL Possible human bone (femur) in cutbank: à 40cm below surface.		
12	1 FAUNAL MATERIAL, , , SIZE GRADE 4 Bear claw in cutbank.	86-22-1	X
13	EDGE OF WATER		
14	1 BIFACE, MORRISON QUARTZITE/GRAY TONGUE RIVER SILICIFIED SEDIMENT, COMPLETE, SIZE GRADE 6	86-22-2	X
15	1 BONE TOOL, , COMPLETE, SIZE GRADE 6 Scapula hoe.	86-22-3	X
16	1 SW corner excavation of extended coalescent house.		
17	1 SE corner excavation of extended coalescent house.		
18	1 SIDE SCRAPER/RETOUCHED FLAKE, MORRISON QUARTZITE/GRAY TONGUE RIVER SILICIFIED SEDIMENT, FRAGMENT, SIZE GRADE 3		

Table 10. Continued.

MAP #	DESCRIPTION	COLLECTED ?
19	1 NE corner Features 102 and 202 Area B.	
20	CUTBANK S of Features 102 and 202 Area B.	
21	CUTBANK S of Features 102 and 202 Area B.	
22	1 SW end Features 102 and 202 Area B.	
23	CUTBANK W end Features 102 and 202 Area B.	
24	1 N end of trench; Features 102 and 202 Area B.	
25	CUTBANK W edge Features 102 and 202 Area B.	

> that there were either ecological or social conditions operating which are not fully understood. Highland Leavenworth and the other sites in the breaks were well away from water and the timber, farm land, and other resources of the flood plain. A desire to be close to these resources must have been modified by other considerations. One possibility is that these sites were another type of seasonal settlement, possibly occupied during early spring, late fall, and mild winters. The absence of remains of immature individuals from the sample of unworked animal bone...may support the suggestion of a winter occupation. If this was true, there would have been no need for farm land, although firewood and water would still have had to be carried up to the villages. There are no indications that these situations had a defensive character, but they did command a broad view of the valley. It seems possible that food surpluses from the gardens were so small as to make a maximum utilization of game resources imperative. If this was the case, the upland villages may well have been occupied so a continuous daylight watch could be kept for bison which had moved into the valley. While this explanation is not an entirely satisfying one, it is the best which occurs at this time.

As a result, the Extended Coalescent component can be considered to have the potential to contribute additional information on the prehistory of the Middle Missouri subarea. The Leavenworth Village and cemeteries have already contributed to the understanding of Arikara village life during the time of initial Euroamerican contact. Although the village is deeply buried underwater, the burial areas are still subject to erosion. The exact extent of the burial areas is not known since surface evidence of burial pits is lacking. Bass et al's (1971:31) excavation method of stripping the soil with mechanical equipment until indications of a burial was located is evidence of this fact. As shown in Figures 14 and 15, there are numerous unexcavated areas occurring in the area of Bass et al's (1971) excavation which could also contain additional burials. As such, the extent of the burial areas is, for the present, based on the topographic characteristics of the burial area (i.e., extent of the terrace/knoll). Additional burials could be exposed due to erosion and should be considered significant and minimally requiring reburial if not detailed analysis. Accordingly, both the Extended Coalescent component (the research potential documented by Franke n.d.:1) and the historic Arikara burial areas (as documented by Bass et al. 1971; Krause 1971) should be considered eligible for nomination to the National Register of Historic Places.

39CO10:

Standing Bear Village is a fortified Extended Coalescent village (Lehmer 1971:Figure 77) near the confluence of Oak Creek and the Missouri River. The site formerly occurred on a terrace south and west of Oak Creek and immediately above the presently inundated Milwaukee Railroad tracks (see Figure 16). Erosion due to wave action has destroyed any surface indications of fortifications or earthlodge depressions although considerable quantities of cultural materials are still present on the beach during low lake levels encompassing an area measuring approximately 300 m north-south by 200 m east-west.

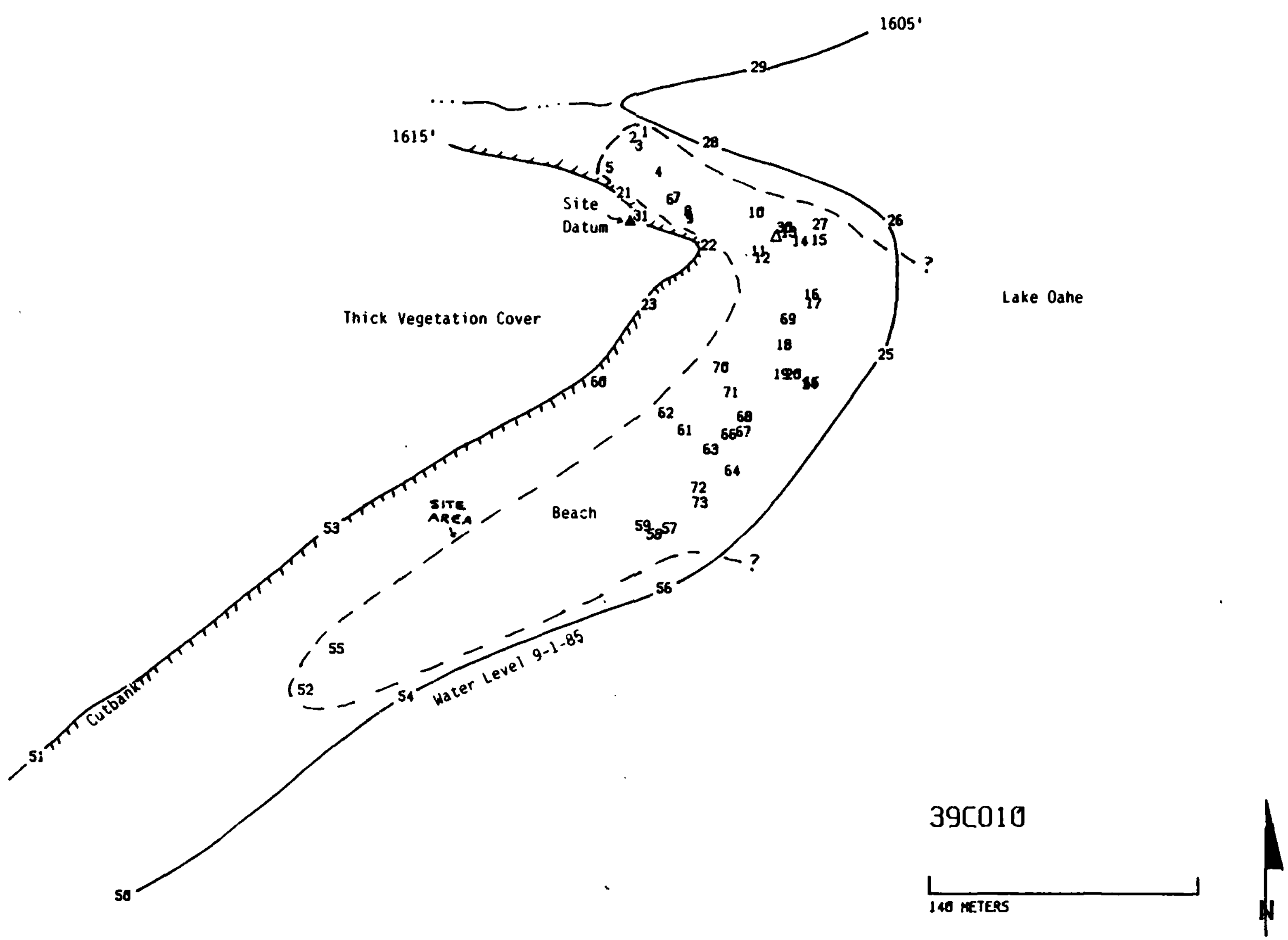

Figure 16. Map of 39CO10.

Several investigators have visited the site and assigned it the names Norvold Village (39CO205) and Standing Bear Village (39CO7 and 39CO10). As will be discussed below, regardless of the site names and numbers, they all refer to the same cultural manifestation.

W. H. Over initially recorded the site as both Norvold Village and Standing Bear Village. The locational descriptions of these villages are identical as shown below:

> This village [Norvold] is on the west side and adjoins the Milwaukee Railway track, about two miles northwest of the bridge at Mobridge in Corson County.
>
> It is on a high terrace near Oak Creek where the latter makes a sharp bend to the east to empty into the Missouri River.
>
> It has been fortified and shows a trench most of the way around it, except on the east side, where the steep bank facing Oak Creek forms the protection. (Sigstad and Sigstad 1973:51)

> This site [Standing Bear] is a small fortified village on the southwest side of the Milwaukee Railway tracks about two miles up Oak Creek from the railway bridge. At the northwest corner of the village site, Oak Creek makes a sharp bend and reaches up to the tracks. It is on the second [terrace] above Oak Creek. (Sigstad and Sigstad 1973:59).

The maps of the two villages are also identical in respect to it's position relative to the Milwaukee Railroad tracks and Oak Creek (see Sigstad and Sigstad 1973:52,60). The source of confusion lies in Over's legal location of the Standing Bear Village in Section 27, T. 19 N., R. 29 E. This location would place Standing Bear Village approximately 4.5 miles to the west-southwest on the high bluffs above the Grand River. R. B. Johnston apparently checked this location in 1966 and did not find any village (see Volume 2, Appendix C).

Another source of confusion lies in the similar names of Over's Norvold Village with Norvold I (39CO31), discussed by Wedel (1955). It is apparent that W.H. Over recognized these as two separate sites given the legal location, description and map of Norvold Village (39CO205) and his location, map and description of Wedel's (1955) Norvold I which Over called Oak Creek "C", or the Ashley Island Village (see Sigstad and Sigstad 1973:33-37 and 54-55). As a consequence, it can be safely assumed that Over's Norvold and Standing Bear Villages are the same site. James Haug has also noted and regarded these site names and number as the same on the South Dakota State Archaeological Survey site forms. Site 39CO31, a fortified Post-Contact Coalescent village is discussed later in this chapter.

R. C. Farrell and J. J. Hoffman recorded this site as 39CO205 in 1952 and provided the most detailed information concerning its contents. Although Over noted the presence of several lodges or depressions on his maps of the site (see Sigstad and Sigstad 1973:52, 60), Farrell and Hoffman recorded a "small compact fortified site with [an] inner ditch around [a]

square house ring. No surface indications of other house rings" (see Volume 2, Appendix C). According to their measurements, the outer fortification ditch was 250 feet (76.2 m) north-south, 225 feet (68.6 m) east-west, 15 feet wide (4.6 m) and averaged 3.5 feet (1.07 m) in depth. The inner ring which surrounded the square house measured 243 feet (74.1 m) in circumference or 77.3 feet (23.6 m) in diameter and 2.5 feet (0.76 m) in depth.

In addition to these features, Farrell and Hoffman also note the presence of extraordinary quantities of shell, bone, stone (presumably burnt), ceramics and lithic debitage. Farrell and Hoffman state that the site is small, could be easily dug and recommended test excavations. Considering the unusual features present at this site, it is unfortunate that no additional work was ever conducted.

The 1985 investigation found that wave action had either destroyed or entirely masked any surface indications of the fortification ditches or house feature. However, large quantities of bone, fire-cracked rock, lithic debitage, stone tools and ceramics were observed on the beach especially in an area of dark soil. Collected ceramics are comparable to La Roche wares recovered from other Extended Coalescent villages (see e.g., Stephenson 1971; Hoffman 1967, 1968). Typical specimens are illustrated in Figure 17. Older cultural components are suggested by the recovery of a Late Plains Archaic Pelican Lake projectile point (cf. Reeves 1983:Figure 12, No. 19) illustrated in Figure 17e and a Folsom point. The latter was reportedly found on the beach in the same area as that occupied by 39CO10 (Marion Travis 1985 personal communication; Travis and Haberman 1983). As a result, additional buried cultural levels could occur below the present beach exposure and probably within the dark soil which could yield additional information on the prehistory of the Middle Missouri subarea. This site is therefore recommended as potentially eligible for nomination to the National Register of Historic Places. Test excavations would be necessary to determine if any intact cultural deposits are present. Test excavating in the area of greatest surface artifact concentration would probably result in exploring the Extended Coalescent component. However determining the location of any earlier component would be more difficult due to its probable smaller spatial extent. As a result more areas of the site may have to excavated to locate any earlier occupation. Potentially this could involve backhoe trenching. Any further investigation of the site is however limited by the pool elevation. Elevations of 1605 feet are necessary merely to expose the site while elevations of 1600 feet or lower would be necessary to dry the soil in order that excavations could be conducted. These prerequisites would have to be met before the potential eligibility of this site could be investigated.

39CO12:

This site is comprised of two components which have been also referred to as 39CO32 and 39CO33. This site has been combined under 39CO12 as a result of discussions with the SDARC particularly because of their close proximity to one another and due to the fact that the history of their investigation has been intertwined. This is most evident in the variety of names and Smithsonian numbers that have been assigned to the site. A discussion of the history of the archeological investigations of this site area should help to clarify some of this past confusion. It should be

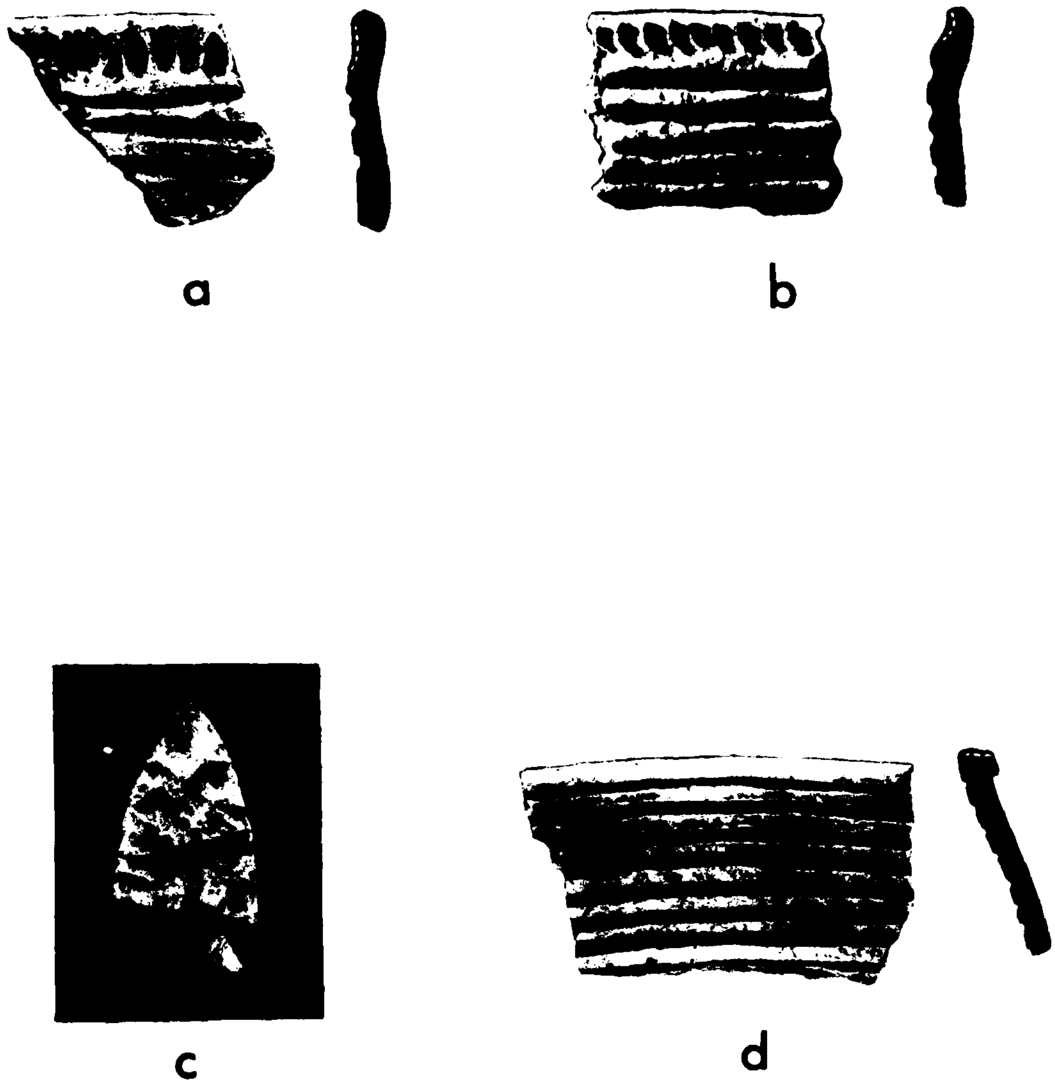

Figure 17. Artifacts from sites 39CO10 (a-c) and 39CO12 (d): a and b-La Roche Incised "S" Rim; c-Pelican Lake corner notched projectile point and d-La Roche Horizontal Incised. All artifacts are actual size.

pointed out that only by producing an accurate map of the site area during the 1985 investigation was it possible to clarify this confusion.

The site occupies the top of a long narrow bluff at the confluence of Oak Creek and the Missouri River. The two components both earthlodge villages separated by various fortification ditches (see Figure 18 and Table 11) which combined measure approximately 300 m north-south by 200 m east-west. Most of the site is on private land currently occupied by Willie Hepper. Scattered cultural materials also occur another 120 m to the south of the village area. W. H. Over initially investigated the site area in 1917. He observed a fortified village which plainly showed a double village (Sigstad and Sigstad 1973:51-53). He assigned the name "Oak Creek A" to the southern half of the village and "Oak Creek B" to the northern half. Over (Sigstad and Sigstad 1973:53-54) provides the following description:

> At the extreme point of this tableland are situated villages "A" and "B". Both are fortified, but later they were joined together to form one (see map). Together they are about 125 yards long and 90 yards across in the widest place which is through "A". The south end of the latter is probably shortened by the erosion of the edge of the bluff.
>
> The trench is not as prominent as at village "C" [39CO31]...nor are there refuse heaps to indicate long habitation. There are nine circles in "B" and five in "A". Excavation yielded no bone material anywhere. Flint implements and chips were abundant on the surface as well as below. The flint material is identical to that used by the Mandan Indians. From the edge of the bluff, a nearly complete clay pot was taken. This was surrounded in the soil by five infant skulls. The pot is typical of the Mandan make and decoration.

In addition to villages "A" and "B", Over observed that:

> The flat extending northwest for several rods is covered with small mounds of earth and stones. Further up where the surface begins to rise, slight lodge circles can be identified, and a very shallow trench is noticeable and can be traced down on the flat. Excavation in the mounds yielded no camp debris. But these mounds and stone piles are not artificial, nor are the circles and ditch, but they are very old. Our conclusions are that this part of the table land was at one time the site of an old Mandan village (Sigstad and Sigstad 1973:54).

This flat area to the northwest is also mentioned by G. F. Will and T. C. Hecker (1944:85) who observed:

> An Unnamed Site (Arikara), north side of Oak Creek near abandoned Grand River Agency. We have no exact U. S. Survey location for this site which lies on the north

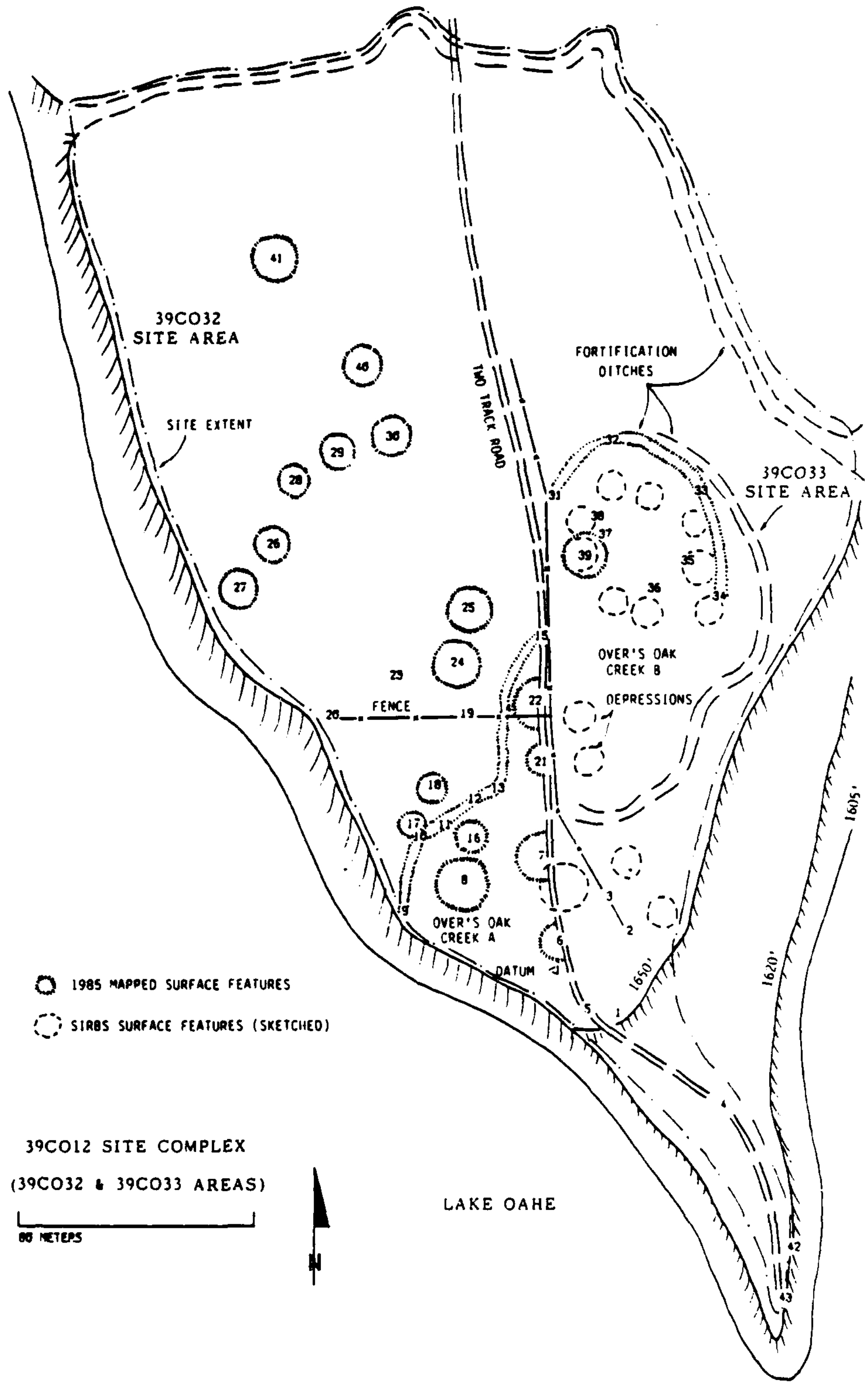

Figure 18. Map of site 39CO12 and components.

Table 11. Map legend for site 39CO12.

MAP #	DESCRIPTION	COLLECTED ?
1	1 S boundary of site.	
2	FENCE	
3	FENCE	
4	1 Road.	
5	1 Road.	
6	1 DEPRESSION Feature 1: 13.7m N-S; disturbed by road cut.	
7	1 DEPRESSION Feature 2: 18m N-S; disturbed by road cut.	
8	1 DEPRESSION Feature 3: 19.5m N-S.	
9	1 DITCH Feature 4; S boundary of site.	
10	1 DITCH Feature 4.	
11	1 DITCH Feature 4.	
12	1 DITCH Feature 4.	
13	1 DITCH Feature 4; corner.	
14	1 DITCH Feature 4.	
15	1 DITCH Feature 4; at road.	
16	1 DEPRESSION Feature 5: 12.5m N-S.	
17	1 DEPRESSION Feature 6: 18m N-S.	
18	1 DEPRESSION Feature 7: 11.6m N-S.	

Table 11. Continued.

MAP #	DESCRIPTION	CATALOG NUMBER	COLLECTED ?
19	FENCE		
20	FENCE		
21	1 DEPRESSION Feature 8: 12m N-S; disturbed by road cut.		
22	1 DEPRESSION Feature 9: 19m N-S; disturbed by road cut.		
23	1 DEPRESSION Feature 10; heavily disturbed.		
24	1 DEPRESSION Feature 11: 18m N-S.		
25	1 DEPRESSION Feature 12: 17.5m N-S.		
26	1 DEPRESSION Feature 13: 14m N-S.		
27	1 DEPRESSION Feature 14: 16m N-S		
28	1 DEPRESSION Feature 15: 12m N-S.		
29	1 DEPRESSION Feature 16: 14m N-S.		
30	1 DEPRESSION Feature 17: 16m N-S.		
31	FENCE		
32	1 DITCH Feature 4: N edge.		
33	1 DITCH Feature 4.		
34	1 DITCH Feature 4.		
35	2 BIFACES At Feature 17: heavy pot-hunting disturbance.	86-26-9,10	I
35	1 RIM SHERD LA ROCHE HORIZONTAL INCISED (c.f. HOFFMAN 1968:PLATE 16b) At Feature 17.	86-26-1	I

Table 11. Continued.

MAP #	DESCRIPTION		CATALOG NUMBER	COLLECTED ?
36	1 RIM SHERD At Feature 18; pot-hunting disturbance.	LA ROCHE INCISED "S" RIM (STEPHENSON 1971:PLATE XVIIIa)	86-26-2	X
37	2 RIM SHERDS, , SIZE GRADE 4 Tool incised.	3 - LA ROCHE INCISED "S" RIM (STEPHENSON 1971:PLATE XVId) 4 - LA ROCHE INCISED "S" RIM (STEPHENSON 1971:PLATE XVIa)	86-26-3,4	X
38	1 DEPRESSION Feature 19; pot-hunting disturbance.			
38	2 BODY SHERDS At Feature 19.	c.f. LA ROCHE HORIZONTALLY INCISED (HOFFMAN 1968:PLATE 16b)	86-26-8	X
38	3 RIM SHERDS At Feature 19.	5 - LA ROCHE INCISED "S" RIM (STEPHENSON 1971:PLATE XIXa) 6 - LE BEAU HORIZONTAL CORD IMPRESSED (HOFFMAN 1967:PLATE 16c) 7 - STEAMBOAT CORD IMPRESSED (HOFFMAN 1967:PLATE 17a)	86-26-5-7	X
38	1 BONE TOOL Scapula hoe; at Feature 19.		86-26-11	X
39	1 DEPRESSION Feature 20: 18.5m N-S.			
40	1 DEPRESSION Feature 21: 16m N-S.			
41	1 DEPRESSION Feature 22: 18m N-S.			
42	1 FAUNAL MATERIAL Shell and bone in cutbank.			
42	1 BONE TOOL In cutbank.		86-26-12	X
43	1 FAUNAL MATERIAL Shell and bone in cutbank.			

terrace of Oak Creek at its junction on the north side of the Grand River. The site covers about 10 acres and the lodge pits appear to be circular type lodge ruins. The pottery is of good quality Arikara culture and shows the slight variation noticeable in some Arikara sites on opposite sides of the river.

In 1938, William Duncan Strong visited the site and named two areas Nordvold 2 and Nordvold 3. Wedel (1955:89) describes these two areas in the following quote:

> Site 2 is a large occupational area, apparently representing actually two village communities, known also as Nordvold 2 (39C032) and Nordvold 3 (39C033)....The southernmost portion of this area, Nordvold 3, is partially enclosed by a ditch. North and northwest of this, house pits and village refuse occur over a considerable area marked near its north edge by what appears to be another defensive ditch curving from the Oak Creek side of the upland tongue to the Missouri Valley edge. This larger area is known as Nordvold 2. Strong informs me (letters February 13 and April 3, 1951) that these two village sites seem to be of dissimilar age, Nordvold 2 apparently being prehistoric or protohistoric Arikara (?), and Nordvold 3 perhaps protohistoric or historic Arikara. This would make Nordvold 2 the older site.

In comparing this description to the dimensions, description and site maps of Over's (Sigstad and Sigstad 1973:34-35, 51-54), it is apparent that Over's "old Mandan village" is the same as Wedel's 39C032 or Nordvold 2 while Over's Oak Creek A and Oak Creek B have been combined under the name Nordvold 3 and assigned the Smithsonian number 39C033. J. J. Bauxar of the Smithsonian Institution River Basin Surveys originally assigned Over's Oak Creek villages the number 39C012 (see Volume 2, Appendix C). However, it was Paul L. Cooper, also with the River Basin Surveys, who assigned the numbers 39C032 and 39C033 in 1951 based solely on aerial photographs.

In addition to the investigations above, R. C. Farrell and J. J. Hoffman visited the site area in 1952 and reported the presence of 70-80 house rings occupying an area approximately 2000 feet north-south by 500 feet east-west (see Volume 2, Appendix C). A 1962 map of these sites corrects the north-south distance of 1000 feet which corresponds to the site size observed during the present investigation (see Volume 2, Appendix D). They believed that the separation of the site into 39C032 and 39C033 was not justified. From the information provided above it is possible to recreate the specific references to the various areas of the site.

Table 12. Site numbers for 39C012 assigned by previous investigators.

W.H. Over	W.D. Strong	J.J. Bauxar	P.L. Cooper	R.C. Farrell and J.J. Hoffman
Oak Creek A	Nordvold 3	39C012	39C033	Suggested combining sites into one.
Oak Creek B	Nordvold 3	39C012	39C033	
Old Mandan village	Nordvold 2		39C032	

The present report utilizes Bauxar's site number due to conversations with the SDARC and the fact that there is no physical separation between the various areas of the site noted by previous investigators. In addition to the villages area, Wedel (1955) describes a cemetery occurring in the vicinity of 39C012 which was excavated by M. W. Stirling in 1923. Wedel (1955:89, 167) states that:

> The burial ground from which were taken the materials ascribed by Stirling to his Cemetery 2 lay along the edge of the uplands just east of Nordvold 2, overlooking a small timbered ravine and, beyond that the Missouri River. Since there seems to be a cultural and time difference between Nordvold 2 and Nordvold 3, it is thus possible that Stirling's burial ground finds include materials that are not those of the same tribal or temporal origin...
>
> At Cemetery 2, 39 graves were opened; and of these, 31, just under 80 percent, each contained the remains of a single individual. The graves were dug pits, ranging in depth up to 5 or 6 feet. Characteristically, the skeletons were covered with logs, or with logs and brush; and sometimes field stones were included in the grave fill, especially in the soil over the head of the deceased. Skeletons were consistently in articulation, but arrangement and orientation of the bodies varied, as elsewhere noted. Artifacts were usually placed about the head, sometimes with additional objects scattered elsewhere about the skeleton. Pigments were usually present. In several graves were robes, or other perishable wrappings. Artifacts were much more plentiful here than in Cemetery 1 [39WW1], occurring in 31 of the 39 graves. They included work in pottery, stone, bone, shell, leather, wood, copper, iron, and glass. The burials of children and infants, though in the minority numerically, were often rather well furnished; with one were found two whole pottery vessels. Skeletal materials, on the whole, were well preserved. European trade goods were found in 13 of the 39 graves.

This cemetery should be located just to the north of 39CO12. This area is presently occupied by a farmstead and any surface indications have been obscurred.

The presence of European trade goods in the some of burials indicate a protohistoric/historic date for this cemetery. However, it is not known to what site the burial are associated with. Wedel (1955:89) suggests that the cemetery could be associated with either or both components at 39CO12. It is also possible that the cemetery could also be associated with the Post-Contact Coalescent site 39CO31 (Nordvold 1), located approximately 300-400 m to the northeast of 39CO32/39CO33.

Larson-Tibesar Associates' investigation consisted of detailed site mapping description and collection of diagnostic artifacts. Figure 16 illustrates the locations of the various artifacts and features present at the site. Based on this map, it is obvious that a number of depressions are still present which are thought to represent earthlodges. It is also apparent that some recent surface disturbances have obscured a number of depressions noted by earlier investigators. These disturbances are mostly confined to the area east of the two track road that divides the site area. Much of this area is occupied by a farmstead and thick vegetation. Evidence of pothunting is also present with one area measuring at least 20 feet in diameter.

The area west of the two track road appears to be the least disturbed and is used as a hay field. As noted on the site map numerous depressions are present in this area. Additional disturbance to the site area occurred during road construction. As shown in Figure 18, at least four possible lodges were disturbed during construction. This road was formerly a highway from Mobridge but has since reverted to a two track gravel road. Disturbance to the site from wave action is probable but not imminent. A minor amount of slumping has occurred along the margins of the bluff but the bluff appears to be relatively stable. As a result only minimal erosion of the site area should be expected. Impacts to the site area from pothunting are more serious. However, since most of the site area is on private land, little can be done except perhaps, to fence the federal land.

The only diagnostic ceramics were collected from the central area of the site (see Figure 18, Map Numbers 35-38) which corresponds to Over's Oak Creek B or the northern half of 39CO33. These ceramics are comparable to Extended Coalescent variant La Roche wares (see Figure 17d). It is unfortunate that additional diagnostic ceramics were not present on the surface of the other areas of the site to aid in determining the number of cultural components present. Based on the previous investigations presented above, it must be assumed that the observed differences in artifact assemblages between the various areas of 39CO12 are basically correct and referable to different occupations. The sequence of occupations, their spatial extent and cultural affiliation are the main questions that need to be answered. It is primarily these questions that have caused the past confusion over this site complex. Until these and other questions, such as integrity of cultural deposits, are answered this site must be considered potentially eligible to the National Register of historic Places.

A series of test excavations are recommended to investigate both southeastern fortified areas, and the larger occupation area immediately to the northwest. Excavation of individual depressions in each of these areas would aid in answering the main questions presented above.

39C030 - Upper Pekelder Village

This large earthlodge village is located on a high narrow bluff measuring approximately 300 m north-south by 200 m east-west and occurring approximately 100 feet above Lake Oahe along a major bend of the Missouri Trench (see Figure 19). W. H. Over originally recorded this village as Pekelder I but little description is given (see Sigstad and Sigstad 1973:55). The legal location of Over's Pekelder villages places them approximately four miles upstream from their location on William Duncan Strong's 1932 map. James Haug notes in the South Dakota State Archaeological Survey site form (on file at the South Dakota Archaeological Research Center, Ft. Meade, South Dakota) that:

> Strong placed Pekelder I ...on high table above the river. This is precisely the location of a village plotted by the Corps of Engineers in 1892 and of 39C048, a Mandan Village briefly mentioned by Over. There can be no question but that there is a village here. I suggest Over used an incorrect legal description, as often happened. This is most likely the actual location of Pekelder I. It is well above the reservoir. There is also some confusion regarding the site name and number. The RBS refers to an "upper and Lower" Pekelder. There upper Pekelder, according to legal descriptions, corresponds to Pekelder I on Strong's [1932] map. They assigned the number 39C030 to it. The Sigstads, in their 1973 edition of Over's notes, apparently switched the Pekelder numbers so that 39C030 became 39C029 for Pekelder I. <u>The RBS designation should be used as the proper one</u>, and Over's Notes of 1973 amended.

Personnel with the Smithsonian Institution - River Basin Surveys recorded the site in 1947 based on Over's notes (R. B. Cumming) and later visited it in 1952 (R. C. Farrell and J. J. Hoffman). The latter reported the presence of 40-50 circular house lodges and a minor amount of surface materials which included sherds, bone and camp rock (See Volume 2, Appendix C). Since the site was high above pool elevation no further work was conducted.

The Larson-Tibesar Associates' investigation found the site to be relatively intact with only minor disturbance on the eastern edge due to slumping. Figure 1 is a map of the site showing the distribution and variation in the size of the depressions. Most of the depressions are circular, although a few appear to be roughly rectangular. The differences in shape may suggest occupations by both Coalescent and Middle Missouri traditions.

Cultural materials at the site were sparse and consistent with Farrell and Hoffman's observations in 1952. This is probably related to its better

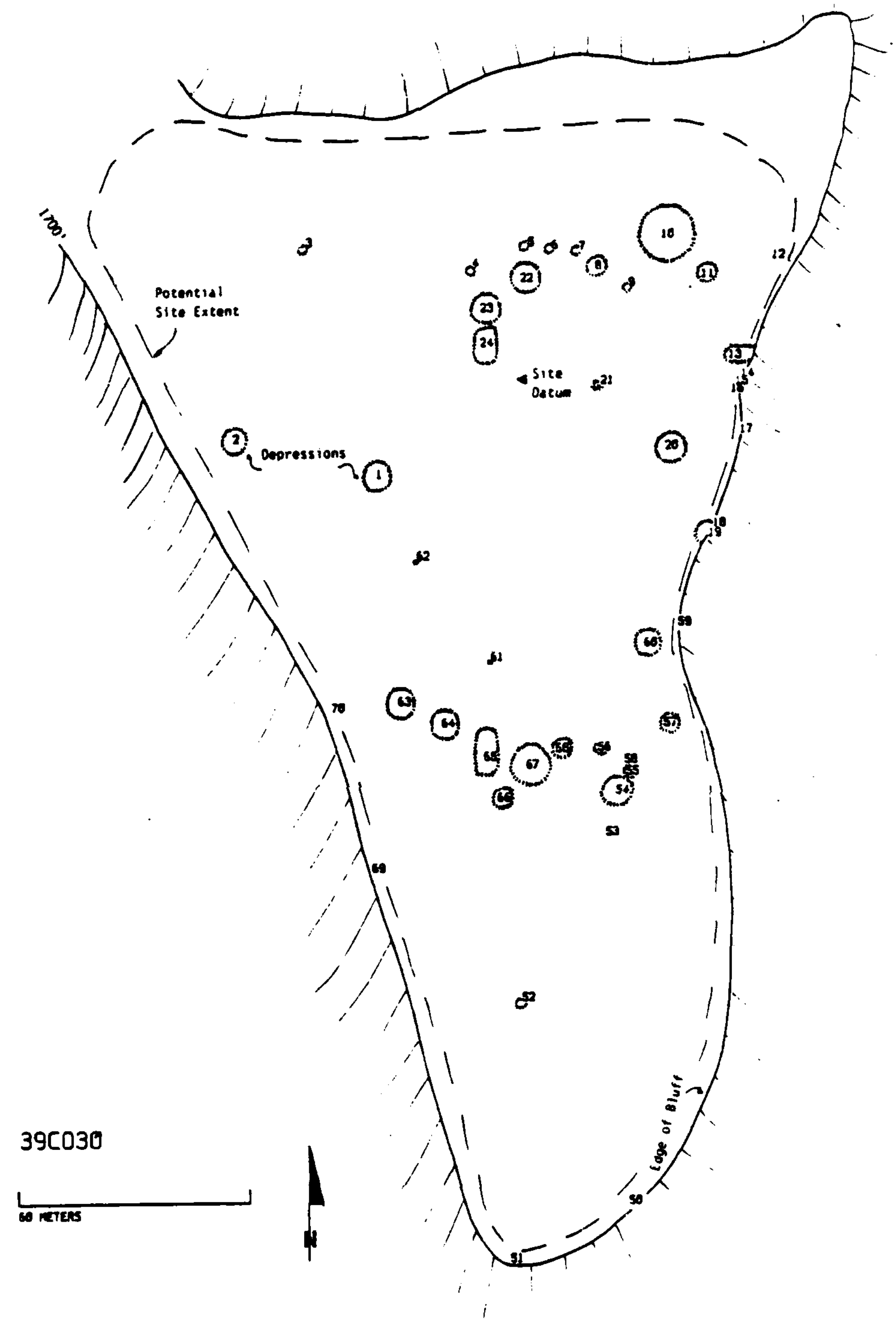

Figure 19. Map of 39C030.

preservation rather than any real lack of materials. Most of the cultural materials were observed eroding from the cutbank at depths ranging from surface to 50 cm below the surface. One undecorated rim sherd was collected but is too incomplete for determining cultural affiliation. Cultural materials could potentially occur throughout the 200 X 300 m bluff top.

Test excavations are necessary to determine the cultural affiliation of the site, the depth of cultural deposits and nature of the various shaped depressions. As a result, this site should be considered potentially eligible for nomination to the National Register of Historic Places.

39CO31:

Norvold I or Oak Creek C is a protohistoric and possibly a historic Arikara fortified village located on a high bluff above the Missouri River, now Lake Oahe (see Figure 20). The site has been known for a number of years and consequently some confusion has resulted from the various descriptions.

The main source of confusion is a result of Sigstad and Sigstad's (1973:34) editing of W. H. Over's field notes in which they change the name of Over's Oak Creek C to Ashley Island Village because the site was apparently "occupied by different Indians." This is unfortunate because there was a historic Arikara village on Ashley Island which is located directly below and east of site 39CO31. This historic Arikara village is mentioned by numerous early fur traders and explorers of the Missouri River including Pierre Antoine Tabeau and Lewis and Clark (Bass et al. 1971:22). Richard Krause (1972:15) reports that:

> These Grand River settlements became a favorite stopping point for almost all expeditions to the Upper Missouri. A number of Europeans resided in one or another of the three villages but the first to leave a written account of his exploits was Pierre Antoine Tabeau. In 1804 Tabeau (Abel 1939:142) reported the Arikara occupying two villages [39CO9-Leavenworth site] on the west bank of the Missouri and a third on an island a league below. The Arikara were occupying these three villages later the same year when Lewis and Clark passed them on their way to the Pacific Northwest. All three villages were still inhabited when the explorers returned in 1805 (Thwaites 1904: II, 186-87), but the island village was abandoned sometime before 1811. Evidently its inhabitants moved to the two west-bank settlements which remained.

It is clear from the following description, that Over was well aware of the village on Ashley Island and the one directly above it (i.e., 39CO31).

> This fortified village is on the high terrace immediately above the Missouri River, opposite the south end of Ashley Island....
>
> The outline of the trench is oval, about 66 yards wide and 84 yards long. In 1915, the fortified trench

39CO31

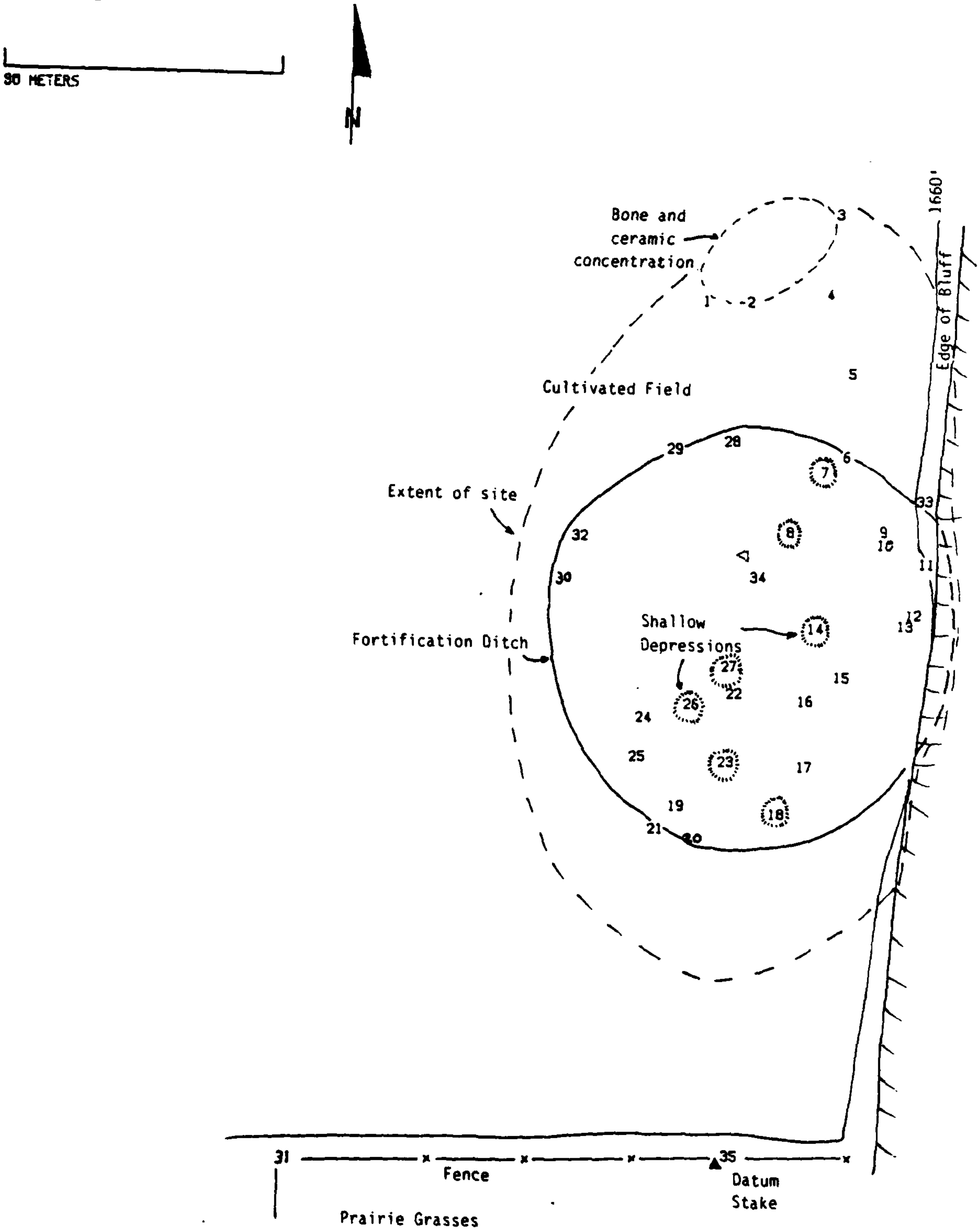

Figure 20. Map of 39CO31.

was about three feet deep. At the nearest point of the trench to the edge of the river bluff, an artificial ditch had been made for drainage. A few feet from this drainage ditch an old path leading down to the river can be defined as far as the low narrow floodplain. This village and Ashley Island were occupied by Arikara Indians in 1804 when Lewis and Clark visited this region.

> There were about 40 lodge sites inside the fortification. On this date, no refuse heaps were noticed on the surface inside the trench, but three large ones were easily defined on the outside, separated from the trench by equal distances. The refuse heap at the south side was quite thoroughly excavated in 1917, yielding numerous potsherds and bone tools which are in the Museum. In 1937, some excavating was done in the refuse heap on the northeast side, from which a quantity of sherds was taken. Crushed buffalo bones were abundant in each heap, also bones and skulls of many different mammals and birds which had evidently been used as food.

> Flint artifacts were not common here. Cone-shaped arrow points were found: these had been made from old copper or brass kettles used in exchange for furs by the early fur traders (Sigstad and Sigstad 1973:34-35).

During W. H. Over's investigation at 39CO31, two burials were recovered along the west bank of the ravine which separates this site from site 39CO12. This area was excavated by M. W. Stirling in 1924 who referred to it as Cemetery 2 and recovered 49 individuals (Wedel 1955:89). Stirling also located another burial area north of 39CO31 which was referred to as Cemetery 3. Wedel (1955:95) states:

> The graves were few in number and much scattered. The mound on this ridge is hard and contains a great many stones, which makes digging difficult. Probably because of this fact, the graves were generally more shallow than those of the cemeteries worked. Stones seemed to have been used as markers and to help fill the graves, simply because there were plenty at hand.

> "This cemetery undoubtedly belongs to the small village (No. 4) [an error, evidently; should read No. 3-WRW], and is of more recent state than No. 2."

European trade goods were found in 26.5 percent of the burials at Cemetery 2 and 50 percent of the burials at Cemetery 3 (Wedel 1955:175). Wedel (1955:89) and/or Stirling apparently associated Cemetery 3 with 39CO31 and Cemetery 2 with 39CO12. The association of these cemeteries to specific village sites is not clear. However, based on the presence of Euroamerican trade goods in the cemeteries and at 39CO31, at least some of the burials are probably associated with this village or perhaps the one occupying Ashley Island. It is not presently believed that the burials are associated with 39CO12 since their ceramics recovered during the present investigation are Extended Coalescent in age.

Available information concerning William Duncan Strong's investigation of the site in 1932 is quite minimal (see Strong 1940) except for his naming the site Nordvold 1. Subsequent investigation of the site was by the Smithsonian Institution - River Basin Surveys.

Paul L. Cooper originally assigned Strong's Nordvold 1 village the number 39CO31 in 1951, based on aerial photographs. The site was later visited in 1952 by R. C. Farrell and J. J. Hoffman who basically verified Over's earlier observations (see Sigstad and Sigstad 1973:34-35). Since the site would be above the water level of Lake Oahe, no further archeological investigations were conducted at the site.

Another investigation of the site area occurred in 1982. This investigation involved the construction of a barn and corrals by Mr. Willie Hepper which encroached onto government land. An investigation by personnel with the U. S. Army Corps of Engineers, which included Tim Nowak, South Dakota Area Archeologist, found the encroachment to be unintentional and recommended that those encroached government lands be exchanged for the private portion of 39CO31. This exchange would then place all of 39CO31 under government ownership and protection (Loup 1983). Correspondence with the USACE, Omaha District (Draft Report Comments), indicates that the landowner did not want the exchange and the Planning Division asked the Real Estate Division to fence the site.

Although this recommendation was forwarded for appropriate action, it was evident from Larson-Tibesar Associates 1985 investigation, that little protection has been afforded the site because nearly the entire site area had been cultivated. Examination of photographs taken during the River Basin Surveys show that cultivation initially avoided the site but later the entire site area became cultivated (cf. Lehmer 1971: Figure 5; U.S. Army Corps of Engineers aerial photograph 153 09 15 45, dated 10-2-81). This cultivation has obscurred or obliterated most of the lodge depressions and fortification ditch and exposed considerable quantities of bone, ceramics, burned rock, debitage and stone tools which are scattered over an area approximately 150 m in diameter. The large concentration of bone and ceramics north of the fortification ditch noted by Over (Sigstad and Sigstad 1973:34-35) is still evident. The collected ceramics are thick and poorly made compared to earlier Coalescent ceramics. They are generally comparable to Talking Crow and Stanley wares (see Figure 21a) which are consistent with a Post-Contact Coalescent age for the site. The bone illustrated in Figure 21b is deeply incised on one side and flattened along one edge (top edge of Figure 21b). A groove has also been carved into this edge. The function of this item is not known but may represent a handle or haft for a tool.

Test excavations are necessary to assess the amount of disturbance caused by cultivation in order to determine the site's present integrity. As a result, the site should be considered potentially eligible for nomination to the National Register of Historic Places. It is strongly recommended that Tim Nowak's initial recommendation of a land exchange be followed through immediately and the entire site area be fenced off to prevent further disturbance. If this is not possible at least the present government boundary should be fenced.

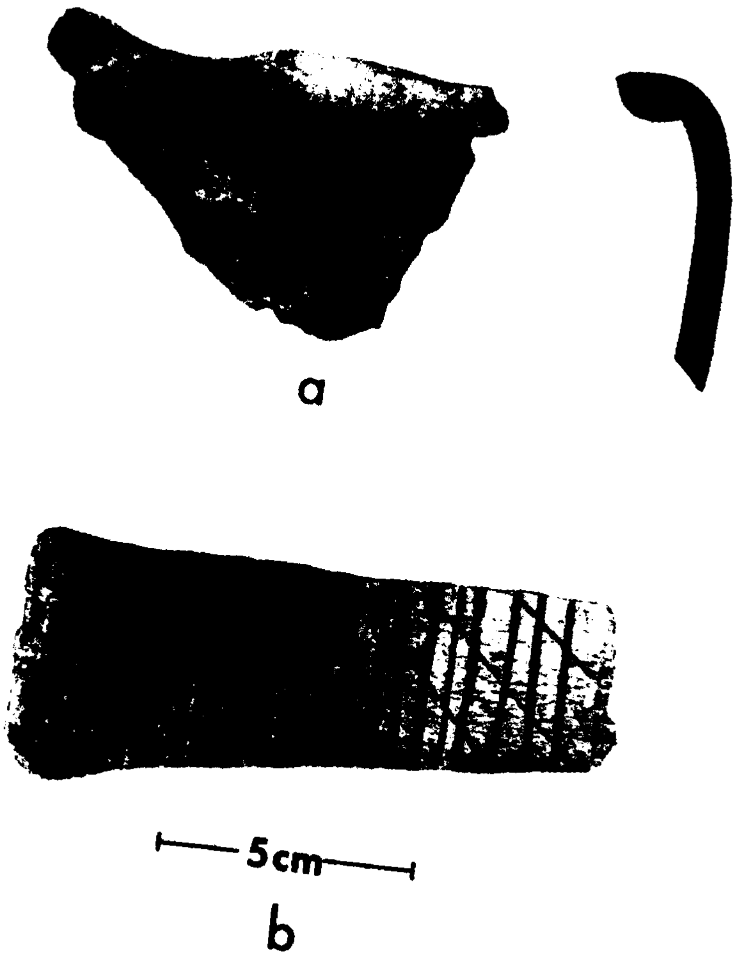

Figure 21. Artifacts from 39CO31: a-Stanley Wavy Rim (actual size) and b-possible bone haft.

39CO35:

Wilber's Site is a nonfortified earthlodge village located on a high, narrow bluff above the Grand River (see Figure 22). The site is along a large bend in the Grand River approximately four miles above its confluence with the Missouri River. R. L. Stephenson of the Smithsonian Institution - River Basin Surveys initially recorded the site in 1961 from a site lead provided by Mr. Wm. Chapman of Wakpala, South Dakota (see Volume 2, Appendix C). Mr. Chapman donated the ceramics, chopper, scraper and projectile point that he collected from the surface of the site to Mr. Stephenson. Lehmer (1971:117) considers the site to be associated with the Extended Coalescent variant. This assessment is most likely due to its ceramics, circular depressions, lack of fortification and geographical setting.

Larson-Tibesar Associates' 1985 investigation found the site to contain at least 22 large shallow, circular depressions and numerous small depressions. Most of these occurred in an area measuring approximately 300 m north-south by 220 m east-west. A single depression occurring another 150 m to the southwest of the main village area may also be associated with the site. Bone, ceramics, flakes and stone tools were observed in the excavated fill of small mammal burrows located in some of the depressions. Slumping along the eastern edge of the bluff has exposed portions of two depressions, which were found to contain bone, flakes and other cultural material within a dark soil. It is evident that the depressions represent earthlodges. Collected ceramics are comparable to Extended Coalescent variant La Roche wares.

The site is covered with prairie grasses while many of the depressions contain various bushes. Surface visibility is therefore often less than 20 percent. The small mammal burrows and cutbank produced the majority of the subsurface exposure and cultural materials observed at the site. Impacts to the site are limited to slumping along the eastern edge. While this can be considered to occur rather slowly, the slumping has nonetheless destroyed portions of two lodges and several others are in close proximity to this actively eroding edge.

Test excavations should be conducted to determine the site's significance, especially in terms of chronological assessment (e.g., radiocarbon dates), nature of the small depressions and to collect a larger sample of cultural materials in order to define the site's characteristics. The site can be considered potentially eligible for nomination to the National Register of Historic Places.

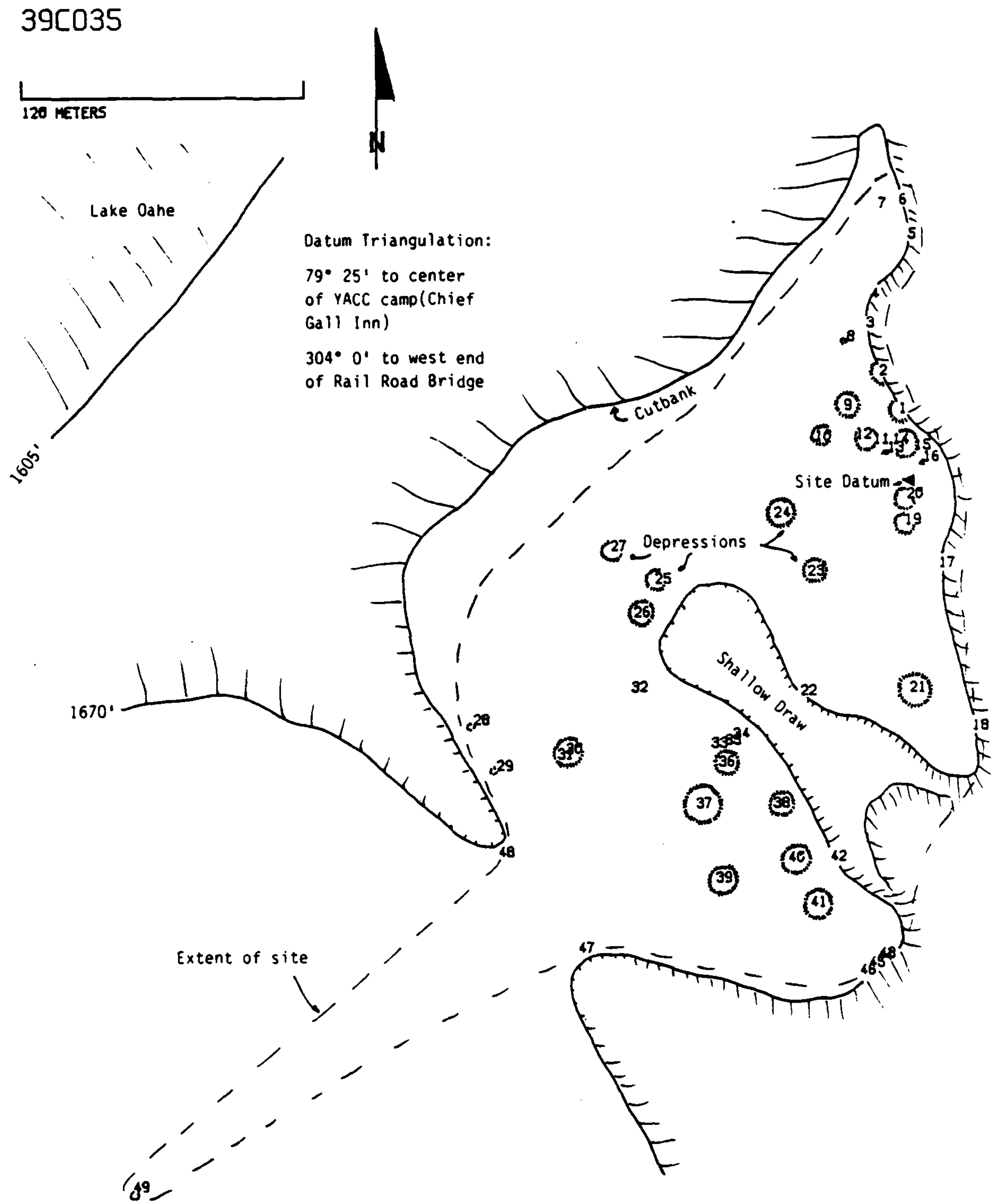

Figure 22. Map of 39C035.

CHAPTER SEVEN
NEW SITES AND ISOLATED FINDS

Paul H. Sanders and Dori M. Penny

Introduction

This chapter presents information on the new archeological sites and isolated finds recorded during the 1985 cultural resource inventory. Table 13 provides a list of the new sites. Additional details concerning these sites are provided in Volume 2, Appendix C.

New Sites

39CO78:

The H & H site, discovered and named by Mr. Marion Travis, consists of a wide scatter of cultural material and possible depressions over an area approximately 400 m north-south by 300 m east-west (see Figure 23). Most of the site is situated on a high, grass-covered bluff overlooking Lake Oahe (formerly the Grand River). This bluff is mantled with a layer of loess approximately 2 meters in depth. A few cultural materials were eroding from the top 50 cm of it. A portion of the site area occurs along a lower slope that is being actively eroded by Lake Oahe. Mr. Marion Travis, a lay archeologist has collected cultural materials from the site and originally provided the location of the site. Mr. Travis (personal communication, 1985) has stated that the lower site area was much more extensive at one time. He reports that cache pits were once visible in cutbanks along the lower portion of the site and it was in this area that he recovered nearly an entire pot, buried rim down. Only the bottom was missing due to its exposure to wave action along the beach.

The cultural materials present at the site include bone, ceramics, fire-cracked rocks, lithic debitage, stone tools and depressions which may represent earthlodges. The ceramics are comparable to Extended Coalescent La Roche wares. Two of the more uncommon ceramic types are illustrated in Figure 24. Most of the cultural material was observed along the edges of the bluff in the two track road and on the beach. The presence of surface concentrations of cultural material, cultural materials exposed in the cutbank and the depressions indicate that additional buried cultural deposits are likely.

The condition of the upper portion of the site is relatively good although the western edge is slowly being impacted by slumping. However the cultural materials occurring among the beach gravels along the southern and lower portions of the site are being actively impacted.

Test excavations are recommended in areas adjacent to surface artifact concentrations or materials exposed along the cutbank to determine if intact buried cultural deposits are present, their age and extent, to

Table 13. List of new sites.

Site Number	Field Number	Site Description	Temporal Affiliation
39CO78	H & H Site	Earthlodge village?	Extended Coalescent
39CO79	L/T 885-101	Artifact scatter	Unknown prehistoric
39CO80	L/T 885-104	Artifact scatter	Unknown prehistoric
39CO81	L/T 885-105	Artifact scatter & 2 mounds	Unknown prehistoric
39CO82	L/T 885-108	Artifact scatter	Extended Coalescent?
39CO83	L/T 885-110	Artifact scatter	Unknown prehistoric
39CO84	L/T 885-115	Artifact scatter	Unknown prehistoric
39CO85	L/T 885-117	Artifact scatter	Late Prehistoric
39CO86	L/T 885-118	Mound	Unknown prehistoric
39CO87	L/T 885-119	Artifact scatter	Unknown prehistoric
39CO88	L/T 885-120	Artifact scatter	Besant
39CO89	L/T 885-126	Rock alignment	Unknown prehistoric
39CO90	L/T 885-128	Depression/artifact scatter	Unknown prehistoric
39CO91	L/T 885-132	Stone circles	Unknown prehistoric
39CO92	L/T 885-134	Cairns	Unknown
39CO93	L/T 885-138	Artifact scatter	Extended or Terminal Middle Missouri
39CO94	L/T 885-141	Cairns	Unknown
39CO95	L/T 885-146	Artifact scatter	Unknown Plains Village
39CO96	L/T 885-148	Artifact scatter	Extended Coalescent
39CO97	L/T 885-149	Artifact scatter	Besant
39CO98	L/T 885-201	Artifact scatter	Unknown prehistoric

Table 13. List of new sites (continued).

Site Number	Field Number	Site Description	Temporal Affiliation
39C099	L/T 885-202	Artifact scatter	Unknown prehistoric
39C0100	L/T 885-204	Artifact scatter	Unknown prehistoric
39C0101	L/T 885-205	Artifact scatter	Late Prehistoric
39C0102	L/T 885-206	Artifact scatter	Late Prehistoric?
39C0103	L/T 885-207	Artifact scatter	Middle Plains Archaic
39C0104	L/T 885-208	Artifact scatter	Unknown prehistoric
39C0105	L/T 885-209	Artifact scatter	Unknown prehistoric
39C0106	L/T 885-210	Artifact scatter	Unknown prehistoric
39C0107	L/T 885-211	Stone circles	Unknown prehistoric
39C0108	L/T 885-212	Cairns	Unknown
39C0109	L/T 885-213	Cairn	Unknown
39C0115	L/T 885-111	Artifact scatter	Unknown prehistoric
39C0116	L/T 885-1	Foundations - YMCA?	Sioux - pre-1903
39C0117	L/T 885-4	Foundations	Hunkpapa - pre-1903
39C0118	L/T 885-5A	Artifact scatter/dump	Sioux - ca. 1900-1950
39C0119	L/T 885-6	Foundations/artifact scatter	Sioux - ca. 1900-1958
39C0120	L/T 885-7	Foundation/artifact scatter	Sioux - pre-1903
39C0121	L/T 885-9	Depressions	Sioux - pre-1903
39C0122	L/T 885-10	Depression	Sioux - pre-1903
39C0123	L/T 885-106	Depressions	Sioux - ca. 1900-1958
39C0124	L/T 885-107	Corral/artifact scatter	Sioux ?-1900's
39C0125	L/T 885-109	Depressions/artifact scatter	Sioux - ca. 1900-1958
39C0126	L/T 885-112	Foundations	ca. 1900-1958

Table 13. List of new sites (continued).

Site Number	Field Number	Site Description	Temporal Affiliation
39CO127	L/T 885-114	Depressions/artifact scatter	Sioux - ca. 1900-1958
39CO128	L/T 885-121	Depressions	Sioux - ca. 1900-1958
39CO129	L/T 885-122	Farmstead	Sioux - ca. 1900-1958
39CO130	L/T 885-124	Depressions	Sioux - pre-1903
39CO131	L/T 885-125	Mad Bear Mission cemetery	post 1871
39CO132	L/T 885-127	Artifact scatter/ dump	Sioux? - pre-1903?
39CO133	L/T 885-129	Depressions	Yanktonai? - ca. 1900-1958
39CO134	L/T 885-131	Depression/dump	Sioux? - ca. 1900-1958
39CO135	L/T 885-133	Depression/artifact scatter	Sioux - ca. 1900-1958
39CO136	L/T 885-135	Depression/artifact scatter	Sioux - ca. 1900-1958
39CO137	L/T 885-136	Depression/Foundation	Sioux - ca. 1900-1958
39CO138	L/T 885-139	Farmstead	Sioux - ca. 1900-1958
39CO139	L/T 885-150	Depression/artifact scatter	Sioux - ca. 1900-1958
39CO140	L/T 885-151	Depressions/trash dump	Sioux - ca. 1940-present
39CO141	L/T 885-147	Depressions	Hunkpapa? - ca. 1900-1958
39CO142	L/T 885-130	St. Thomas Mission	post-1881
	L/T 885-2	Foundation	Historic Sioux
	L/T 885-3	Foundation	Historic Sioux
	L/T 885-5	Depression	Historic Sioux
	L/T 885-8	Depression	Historic Sioux
	L/T 885-144	Artifact scatter	Historic Sioux

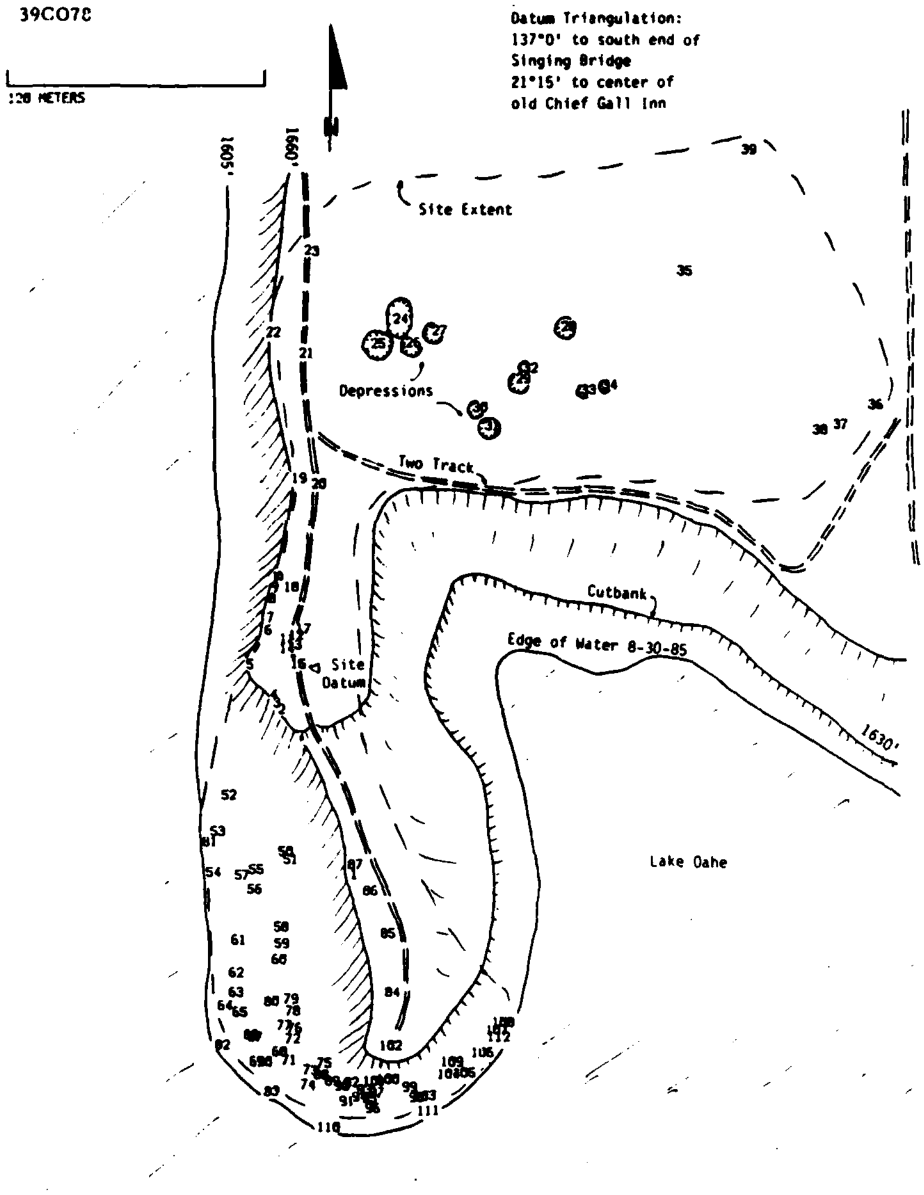

Figure 23. Map of 39C078.

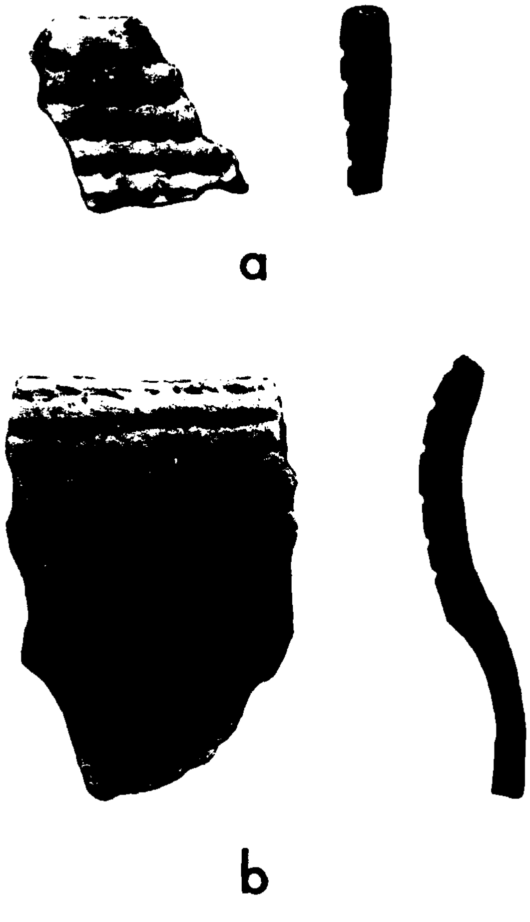

Figure 24. Rim sherds from 39CO78: a-possible Akaska Stab and Drag and b-Le Beau Horizontal Cord Impressed S-Rim. All artifacts are actual size.

investigate the nature of the depressions on the upper terrace surface and overall, the site's significance. Until this can be accomplished, the site should be considered potentially eligible for nomination to the National Register of Historic Places.

39C079:

This prehistoric site consists of three flakes located on a low grass-covered ridge west of Claymore Creek (see Figure 25). The east-sloping ridge is bordered on the south by an ephemeral tributary of Claymore Creek which originally drained into the Grand River. The cultural materials consist of 2 flakes of Knife River flint (one primary and one secondary) and one secondary agate/chalcedony flake which occur in an area approximately 10 m north-south by 40 m east-west. Although soil development is evident, the presence of the site on a ridge slope suggests that such development is minimal. This suspected shallow deposition combined with the low artifact density and overall lack of substantial cultural materials suggests that the site has little potential for containing additional significant buried cultural deposits. The site is therefore recommended as not eligible for nomination to the National Register of Historic Places.

39C080:

The cultural materials of this prehistoric artifact scatter are situated on a small knoll along the western edge of a high bluff approximately 30 m above Lake Oahe (formerly the Grand River) (see Figure 26). This bluff projects outward into Lake Oahe forming a narrow V. The configuration of the bluff suggests that the Grand River formerly flowed along the western base of the bluff. Dense areas of brush are present along the western slope of the bluff while the top of the bluff is covered by various prairie grasses.

The cultural materials occur in an area approximately 35 m in diameter. The majority of the cultural materials are situated on the top and upper slopes of the knoll. Except for grazing, no other impacts to the site were observed. The cultural materials at the site include numerous large mammal bone fragments, fire-cracked rocks, flakes, one biface tip, one utilized flake and three cores. Concentrations of bone and flakes are eroding from the slopes of the knoll suggesting that they are derived from a shallowly buried cultural layer. These concentrations also suggest that the site has good integrity.

The frequency of flakes and cores suggest that tool manufacture may have been a primary activity at the site. The presence of bone fragments and fire-cracked rock indicate that processing of fauna may have also taken place. These cultural materials and the small site size argue for a temporary occupation.

The presence of the cultural material concentrations indicate that additional intact buried cultural materials are very likely which have the potential for contributing information on the prehistory of the Middle Missouri subarea. The site is therefore considered potentially eligible for nomination to the National Register of Historic Places. Test excavations adjacent to the concentrations are recommended to determine the

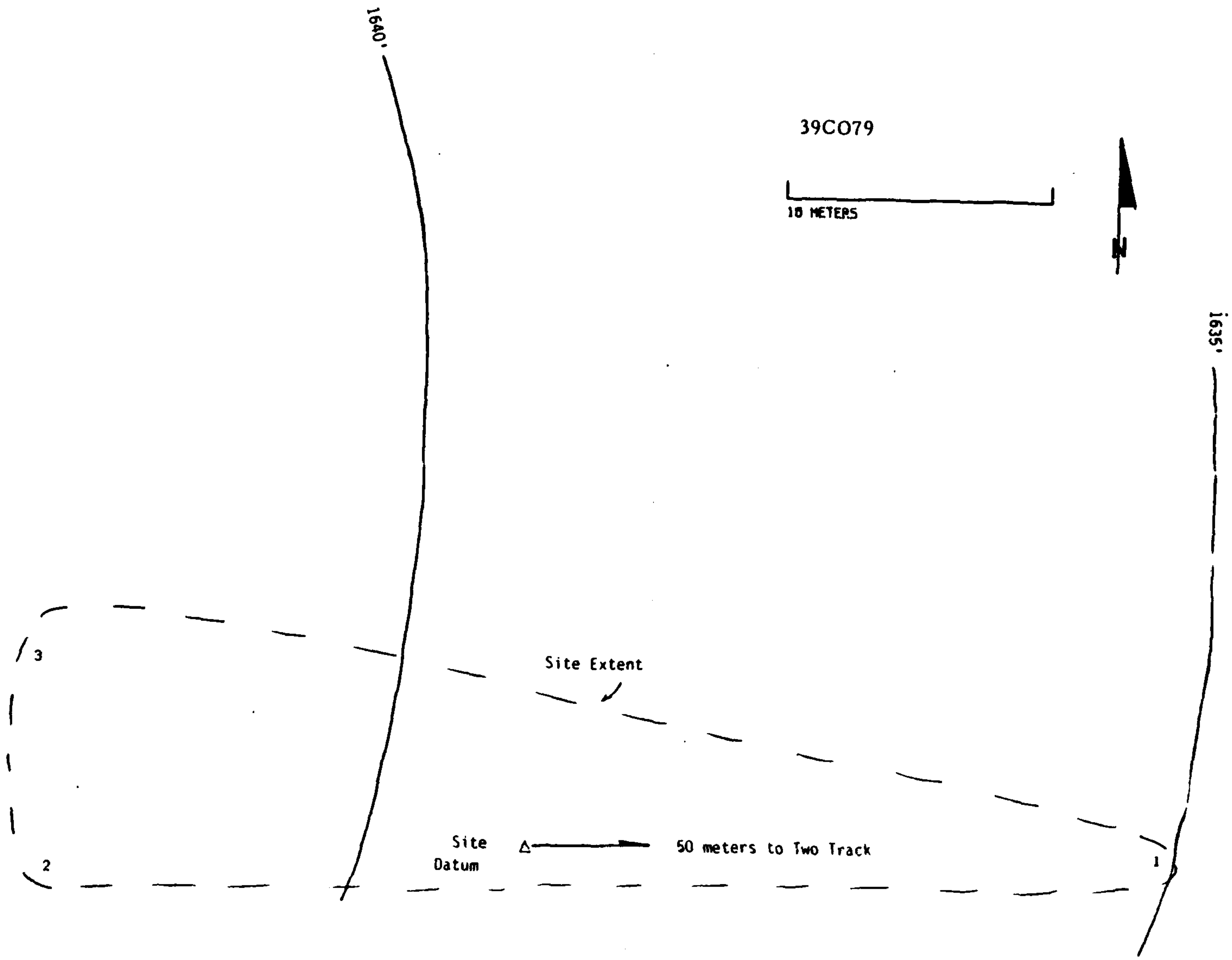

Figure 25. Map of 39CO79.

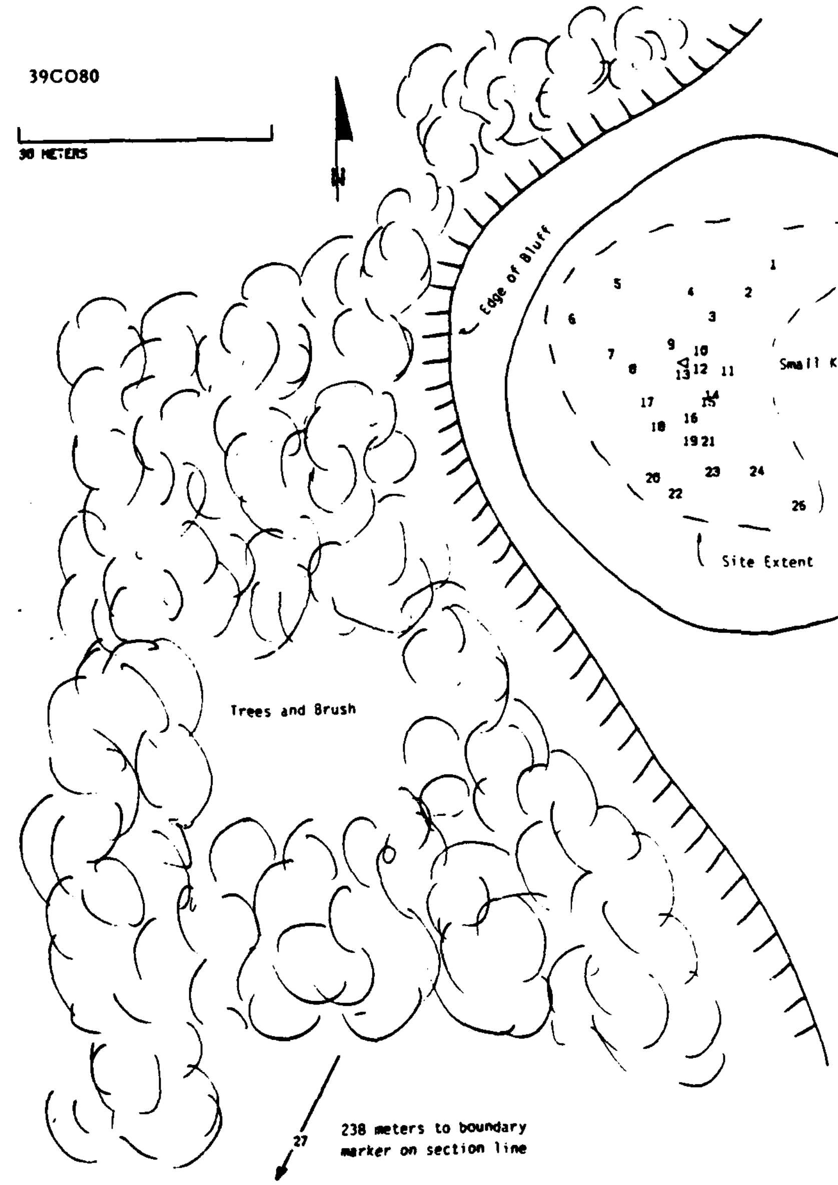

Figure 26. Map of 39C080.

extent, nature and significance of any additional buried cultural materials. Potential research topics include subsistence and faunal utilization, chronological assessment, lithic procurement and manufacture.

39CO81:

The most prominent cultural remains at this site are two large mounds located on the edge of a high bluff along Lake Oahe (see Figure 27). One of the mounds, designated Mound A is immediately adjacent to this edge while Mound B is approximately 50 m to the southeast on the flat, grass-covered bluff top. The presence of gravel pits on the top of the bluff to the south of the site, indicate that soil deposition is quite shallow. Vegetation along the slope of the bluff below the site consists of a hardwood draw community interspersed with various prairie grasses.

Mound A is approximately 28.5 m east-west by 12 m north-south. A two track road which follows the edge of the bluff has cut into this mound and shortened its north-south dimension. Numerous flakes and a few unidentifiable bone fragments are also exposed in this road cut.

The second mound is undisturbed and measures approximately 25 m east-west by 18.5 m north-south. Both mounds rise approximately one meter above the surrounding surface and are suspected to represent burial mounds which frequently occur along the Missouri Trench. These mounds may be associated with the Sonota Complex (Neuman 1975). The entire site covers an area approximately 75 m north-south by 30 m east-west. Except for grazing and the two track road cut, no other impacts were observed. It should be noted that most of the site appears to be on private land. Only a portion of Mound A appears to occur on government land, however a more accurate land survey is necessary to determine the feature property boundaries.

Any portions of the site occurring on government land are recommended for test excavation to determine the site's significance, especially the mounds' specific chronological and/or cultural affiliation. The association of the suspected burial mounds to the flakes and other cultural materials should also be assessed. However, since this site is presently undergoing only minimal impact, these recommendations should be given a low priority. The site should be considered potentially eligible for nomination to the National Register of Historic Places.

39CO82:

The cultural materials at this site entirely occur along the beach of Lake Oahe (see Figure 28). Prior to reservoir construction, this prehistoric artifact scatter would have been situated on a gentle, west-facing slope near the confluence of the Grand River and an unnamed ephemeral tributary. This tributary is approximately 100 m north of the site.

The cultural materials occur entirely on the beach and are lightly scattered over an area measuring approximately 170 m north-south by 40 m east-west. A low cutbank, approximately 50 cm in height rises above the beach along the eastern edge of the site. Although cultural materials were found adjacent to the cutbank, no artifacts were observed in the exposed

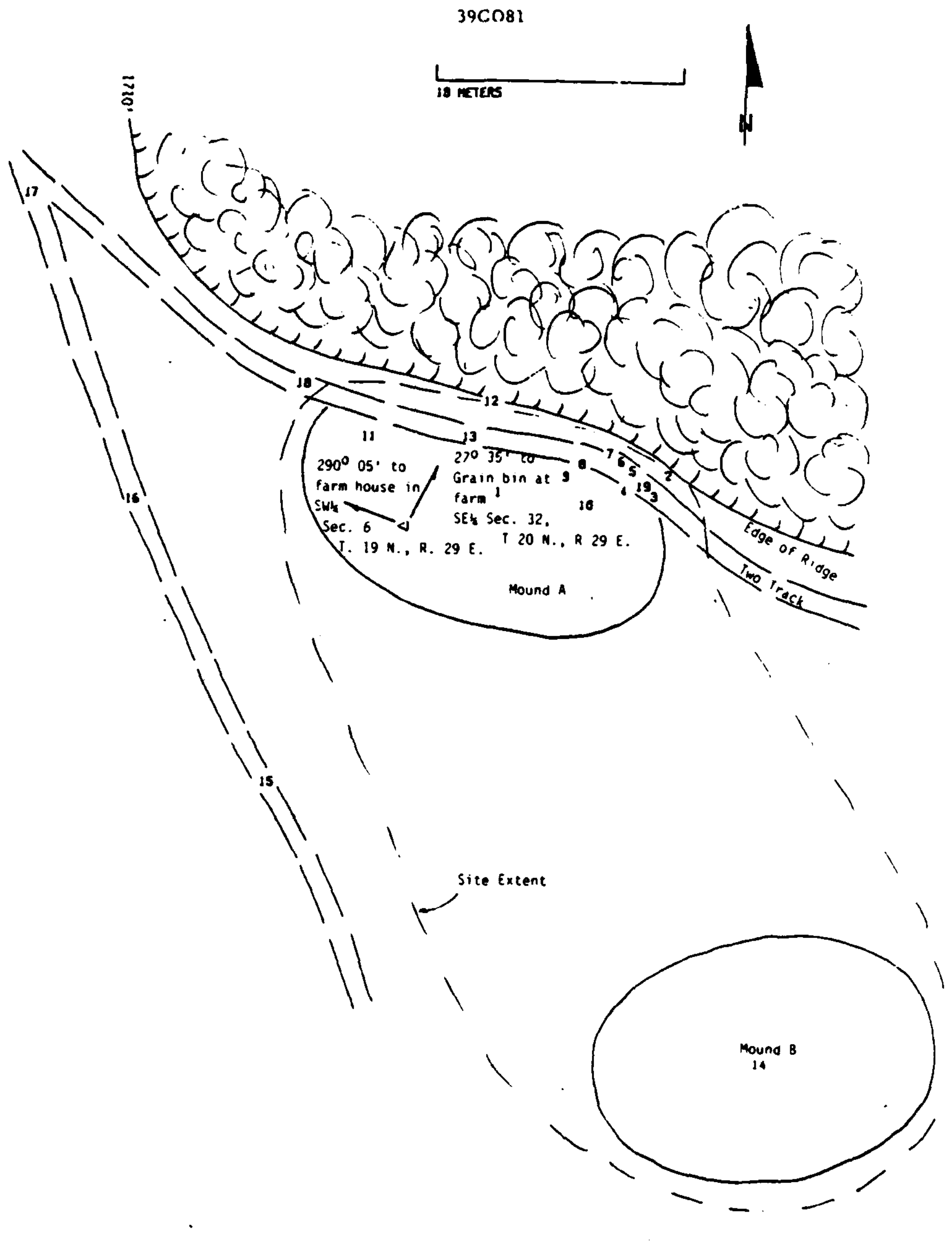

Figure 27. Map of 39C081.

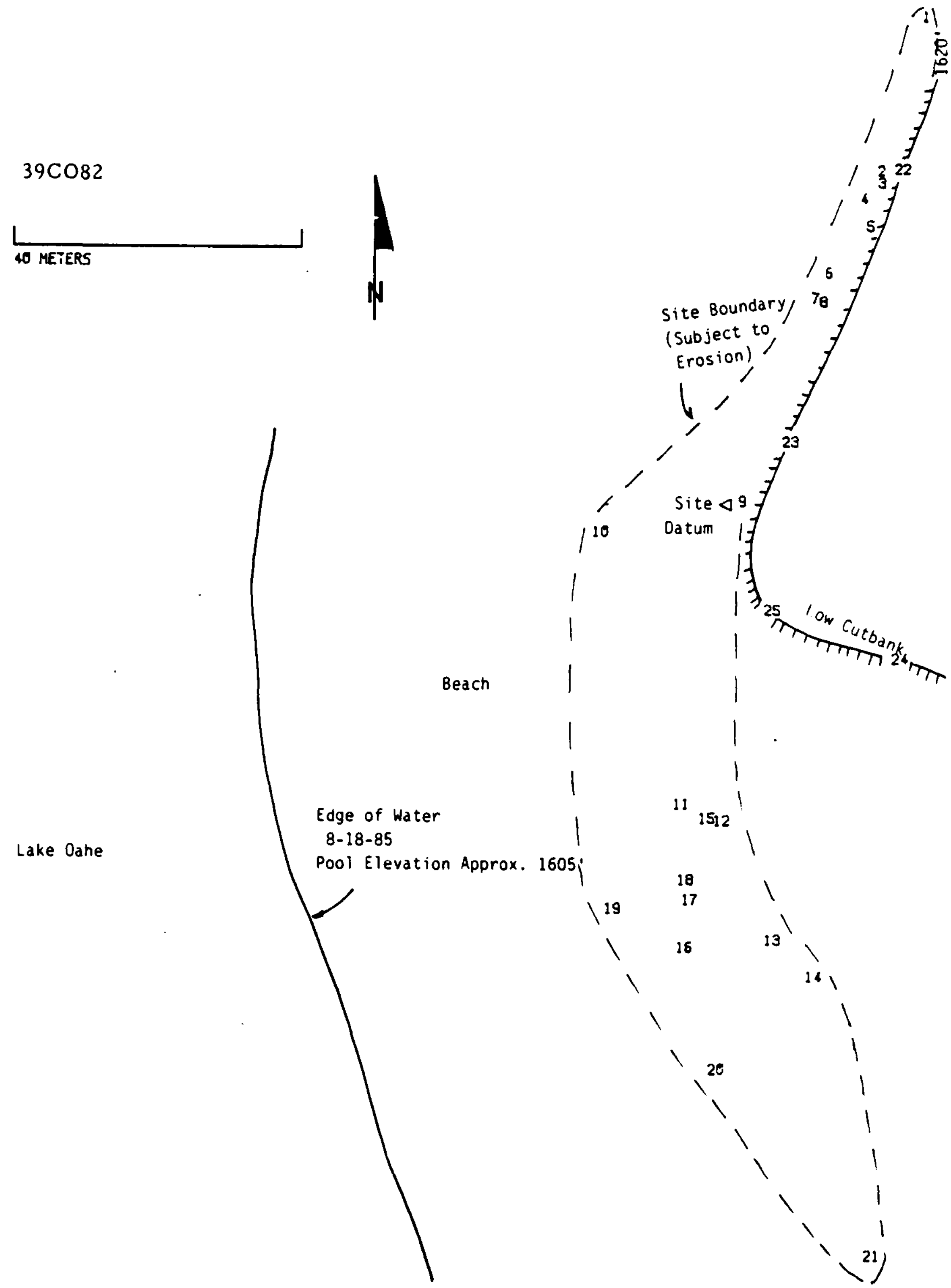

Figure 28. Map of 39C082.

profile. Cultural materials present at the site include flakes of Knife River flint and miscellaneous chalcedony, one core, two end scrapers, one thin-walled, tool incised body sherd and two concentrations of fire-cracked rock. The latter, also found on the beach, may have originally represented hearths or other features prior to their erosion and deflation by wave action. The sherd is fragmentary but its thinness suggests probable affiliation with the Extended Coalescent variant.

It is evident that erosion has destroyed much of the site's original integrity. The only area with a potential for additional intact buried cultural materials is in the northern part of the site where cultural materials were found adjacent to the cutbank. It is possible that additional cultural materials may exist buried in the 50 cm of deposition exposed in the cutbank but based on the low number and density of surface cultural materials, it is suggested that any buried materials would also be quite low in density and number. As such, they would probably not contribute sufficient information to the prehistory of the region to warrant any additional work. This site is therefore not considered eligible for nomination to the National Register of Historic Places.

39C083:

This prehistoric artifact scatter is situated on top of a long, narrow, flat-topped ridge above Lake Oahe (see Figure 29). This ridge which extends southward from the valley-bluff would have been formerly situated between the Grand River to the west and an unnamed ephemeral tributary to the east. The latter is presently covered by prairie grasses and scattered brush.

The cultural materials occur in an area measuring approximately 120 m north-south by 10m east-west and include flakes from a variety of raw materials, fire-cracked rock, one end scraper and two flake concentrations. The flake concentrations occur in the extreme northern end of the site along the upper west-facing slope of the ridge. The concentrations were observed in eroded areas with one concentration estimated to contain 8 flakes in a two meter diameter area. The density of these artifacts and their location in eroded areas near the top of the ridge suggest that these materials were derived from a shallowly buried cultural level. The density of artifacts also suggests that additional buried cultural materials are present which could have the potential to yield additional information on the prehistory of the region. On this basis the site should be considered potentially eligible for nomination to the National Register of Historic Places. Test excavations adjacent to the exposed concentrations are recommended to assess the significance of the site in terms of its research potential. Initial goals of the test excavation should be to determine subsurface extent of the site, depth and chronological affiliation.

39C084:

This site consists of a prehistoric artifact scatter situated on the edge of a bluff above Lake Oahe (see Figure 30). Prior to inundation, the site overlooked Oak Creek to the west and south. The Oak Creek bottoms were formerly forested with cottonwoods, while vegetation on the slopes and

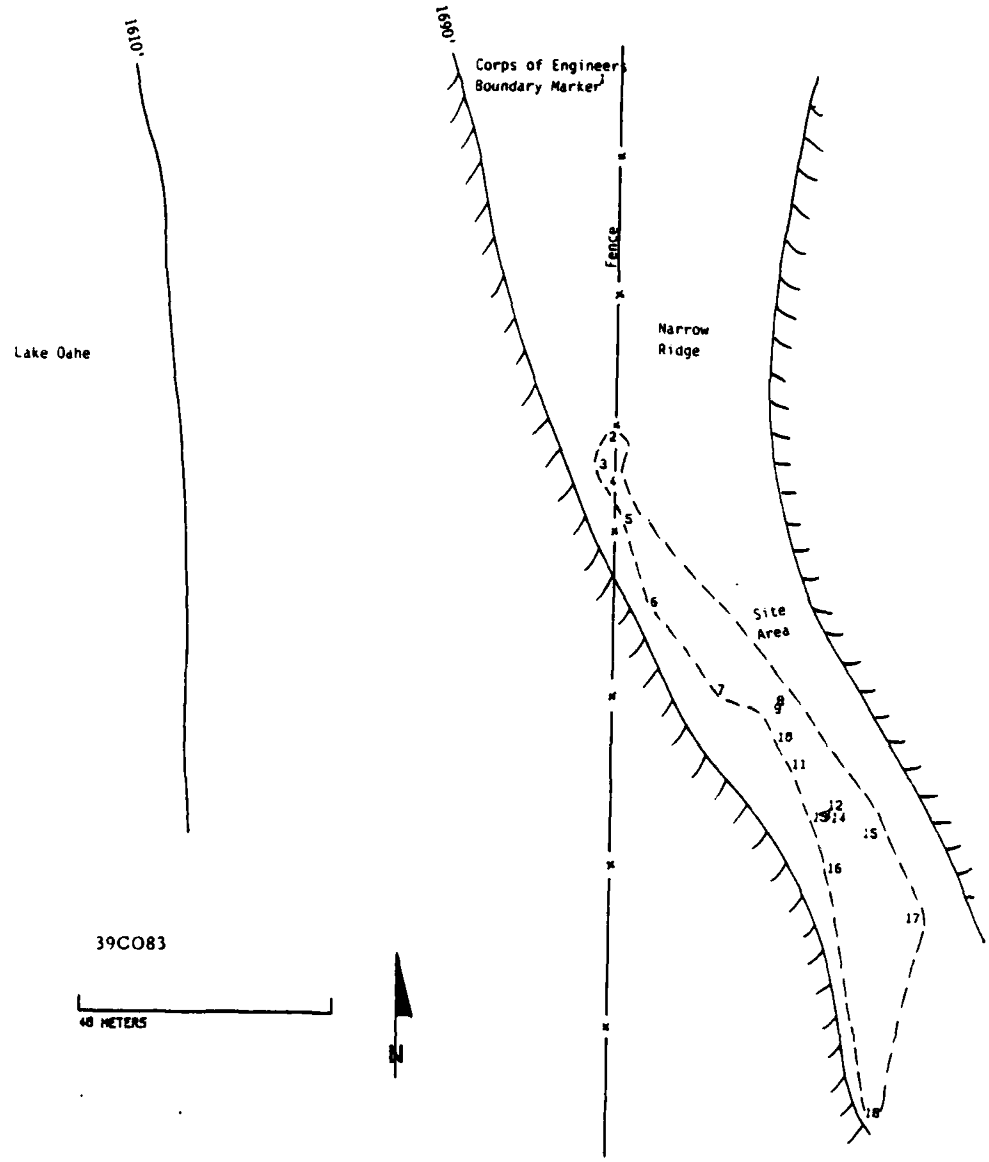

Figure 29. Map of 39CO83.

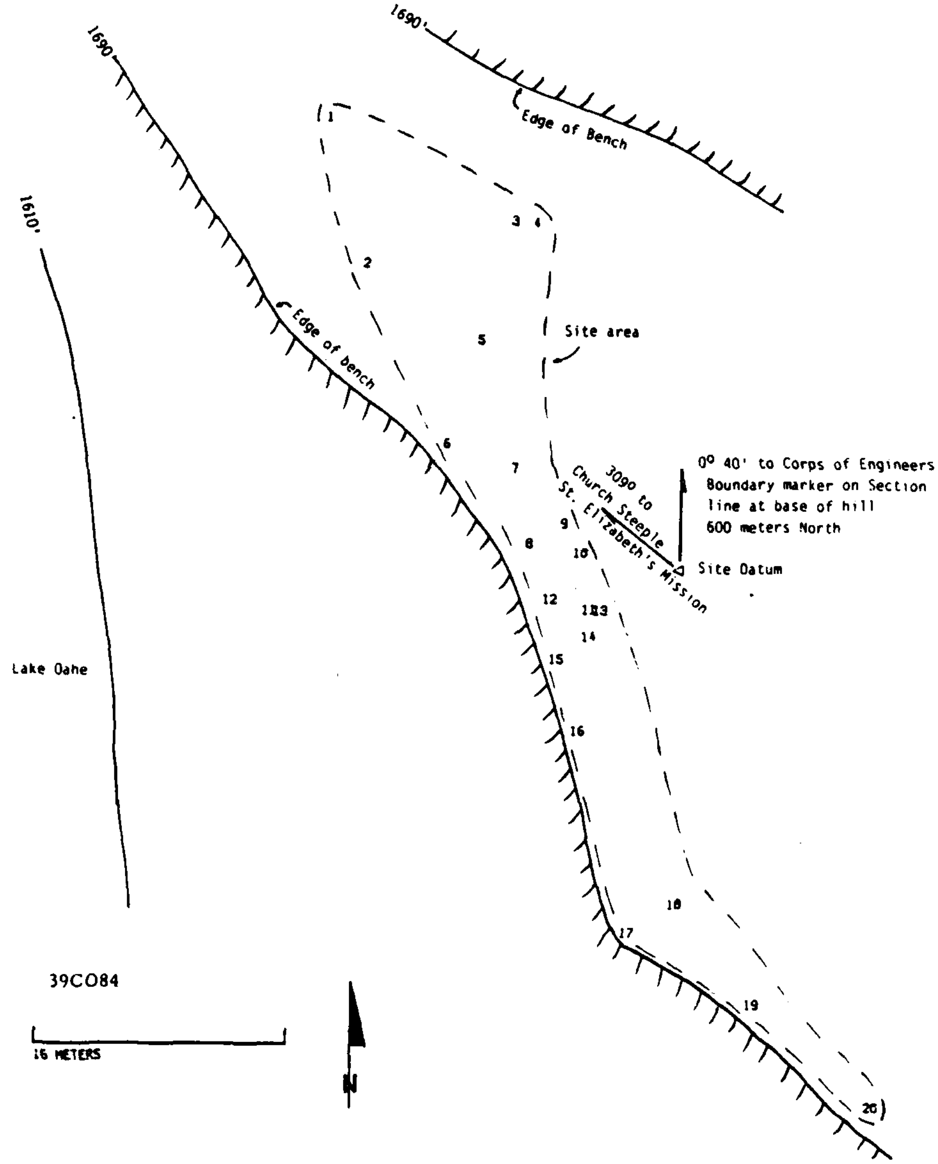

Figure 30. Map of 39C084.

tops of the surrounding bluffs are presently covered with prairie grasses. Glaciofluvial gravels are exposed in erosional cuts along the margins of the bluff and occur on the surface of the site indicating very shallow soil.

Cultural materials include flakes of various raw materials, fire-cracked rocks and one biface fragment widely scattered over an area measuring 70 m north-south by 20 m east-west. The wide scatter of fire-cracked rocks and shallow soil suggest that sheetwash erosion has disturbed the integrity of the site. In addition to grazing, sheetwash erosion is the major impact to the site.

Due to the loss of integrity from erosion, the low potential for additional significant buried cultural materials in the shallow soil, and the low information content of the present cultural materials, the site should be considered not eligible for nomination to the National Register of Historic Places. As a result, no further work is recommended.

39CO85:

The cultural materials at this site consist of a small Late Prehistoric period side-notched projectile point (see Figure 31a) and two biface fragments, all of which are from different raw materials. These artifacts are scattered over an area measuring approximately 15 m north-south by 10 m east-west and are situated at the base of a knoll along an unnamed ephemeral drainage (see Figure 32). The grassland vegetation is sparse due to the steepness of the slope and shallow, gravelly and rocky soil. Barren areas are also common and appear to be caused by sheetwash erosion, grazing and cattle trails. As a result, the site retains little integrity and a low potential for containing any additional significant buried cultural materials. The site is not considered eligible for nomination to the National Register of Historic Places and no further work is recommended.

39CO86:

This site consists of a single prehistoric mound approximately 20 m in diameter and one meter in height (see Figure 33). The mound is situated on a narrow, flat-topped ridge between two inlets of Lake Oahe. The top of the ridge is sparsely covered with prairie grasses due to the shallow soil. Gravel outcrops are present along the upper slopes of the ridge indicative of the shallow soil.

A 30 centimeter diameter shovel test was excavated in the mound to determine the depth and nature of the sediments. The first 15 cm of the shovel test consisted of a brown loam while the next 45 cm was characterized by a tan silty loam with a few carbonate covered pebbles. The excavation did not encounter the bottom of the tan silty loam. The excavated fill was carefully examined but no cultural materials were observed.

The mound is nonetheless considered to be cultural due to the difference in the depth of its sediments compared to the surrounding shallow soil. The site should be considered potentially eligible to the National Register of Historic Places due to its possible function as a burial mound. Test excavations are recommended to investigate this

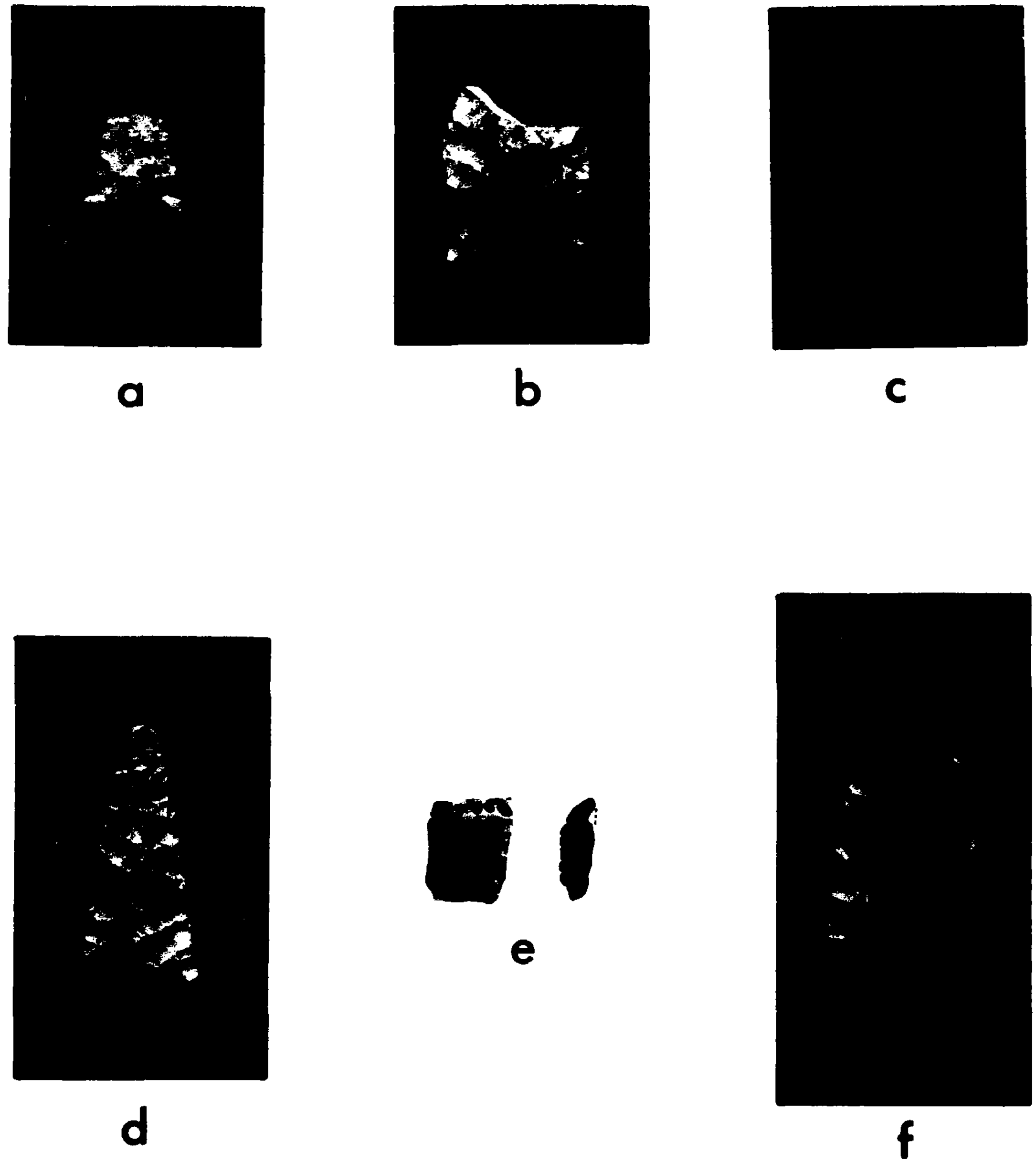

Figure 31. Artifacts from various sites: a-Late Prehistoric side notched projectile point (39C085); b-Besant side notched projectile point (39C088); c-d-Late Prehistoric corner notched projectile points (39C093); e-unclassified rim sherd, possible La Roche ware (39C096) and f-Besant side-notched projectile point (39C097).

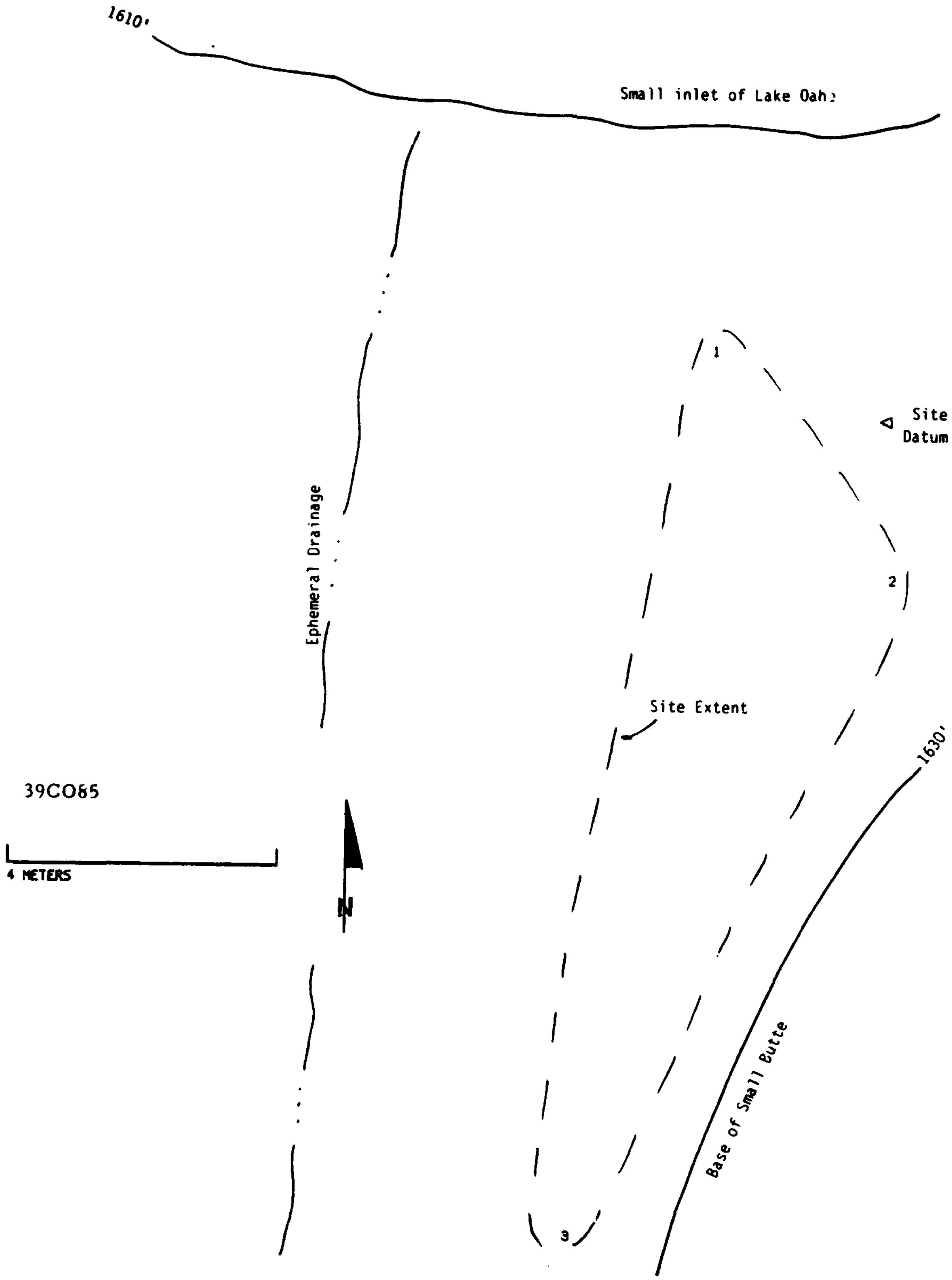

Figure 32. Map of 39CO85.

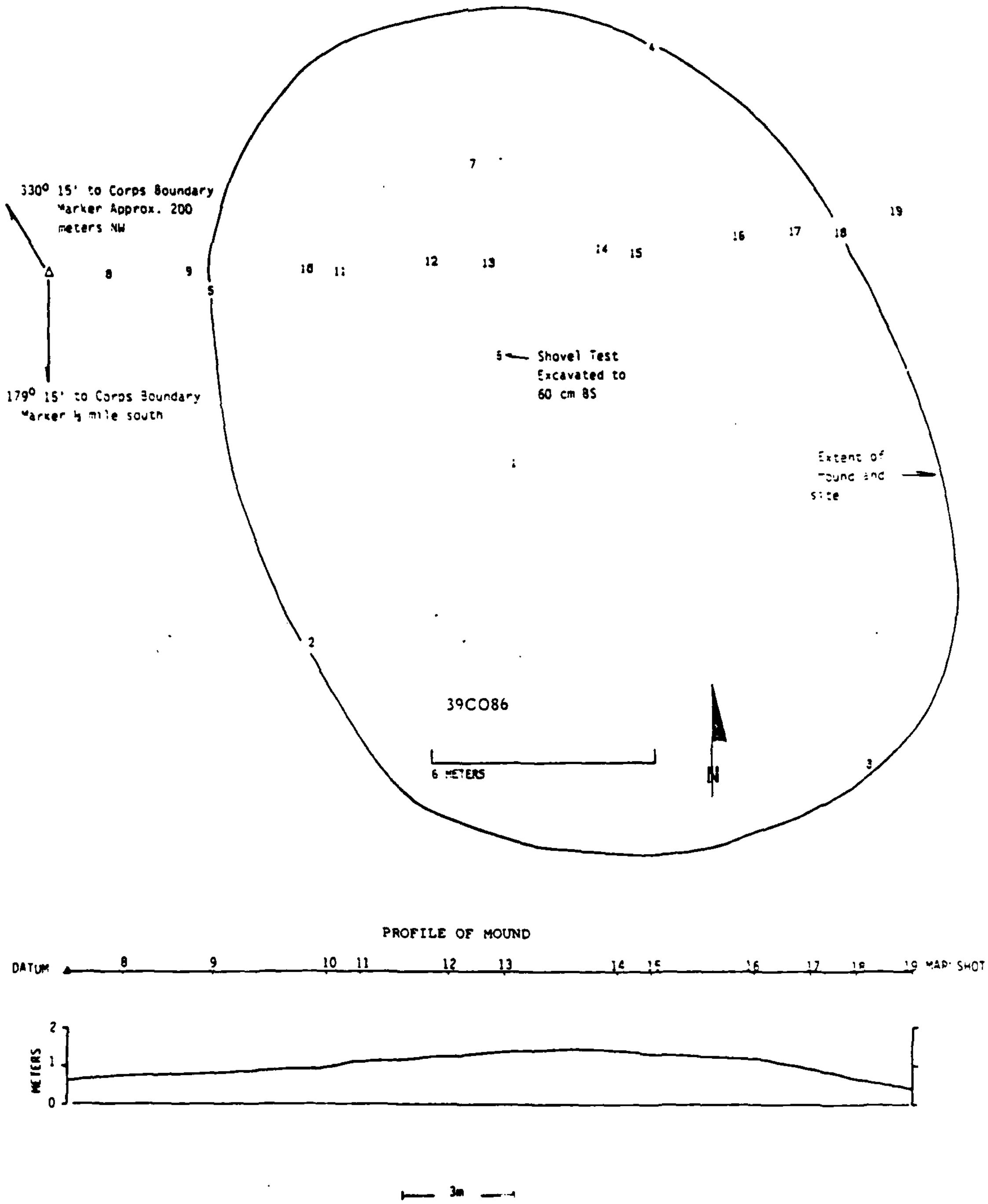

Figure 33. Map of mound at 39CO86.

possibility as well as assess the cultural affiliation and significance of any cultural material present. However since the site is not being impacted and is quite far from any major roads or Lake Oahe, these recommendations should be considered a low priority.

39C087:

The location of this prehistoric artifact scatter is on the slope of a hill above an unnamed ephemeral drainage (see Figure 34). The cultural materials occur in an area measuring 90 m north-south by 30 m east-west. The drainage valley contains scattered hardwoods and shrubs while the slopes of the valley are covered with prairie grasses. Vegetation is sparse in the site area and erosion has exposed numerous areas of clayey soil. Sheetwash has apparently been quite active as evidenced by numerous small erosional channels on the slope of the hill and the scattered distribution of the materials especially the fire-cracked rock. None of the fire-cracked rock was observed as concentrations which would have suggested the presence of an intact feature. This fact indicates that the site retains little integrity or evidence of any additional buried cultural deposits. Although a variety of cultural materials are present, including 2 mano fragments, 3 utilized flakes, fire-cracked rock and flakes of Knife River flint and Tongue River Silicified Sediment; the lack of integrity of the site argues that the site should not be considered eligible for nomination to the National Register of Historic Places. No further work is recommended.

39C088:

This small prehistoric artifact scatter is situated on top of a large ridge on the north side of Lake Oahe (see Figure 35). The ridge is bounded on the east and west by unnamed ephemeral drainage valleys. These valleys contain scattered hardwoods, shrubs and prairie grasses while the surrounding valley slopes and ridgetops are covered with various prairie grasses. The tops of the ridges also contain outcrops of glaciofluvial gravels and minimal soil development. This site is located on one of these ridgetops.

The site consists of 2 possible cores, a utilized flake, a flake, a large side-notched projectile point fragment and a possible fire-cracked rock scattered over an area measuring approximately 30 m north-south by 10 m east-west. All of these items are made from Smooth Grey Tongue River Silicified Sediment which is available in the local outcrops of glaciofluvial gravels.

Since all of the cultural materials are of a similar raw material, the site may have resulted from the manufacture of stone tools. The projectile point has wide shallow notches and a straight, ground base but is missing its tip due to an apparent flaw in the material. The point (Figure 31b), is similar to Besant specimens, suggesting a general time period for the activities conducted at this site.

Although the condition of the site appears good and has been only impacted by grazing, the site is not considered eligible for nomination to the National Register of Historic Places due to the shallowness of the soil, low potential for additional significant buried cultural deposit and

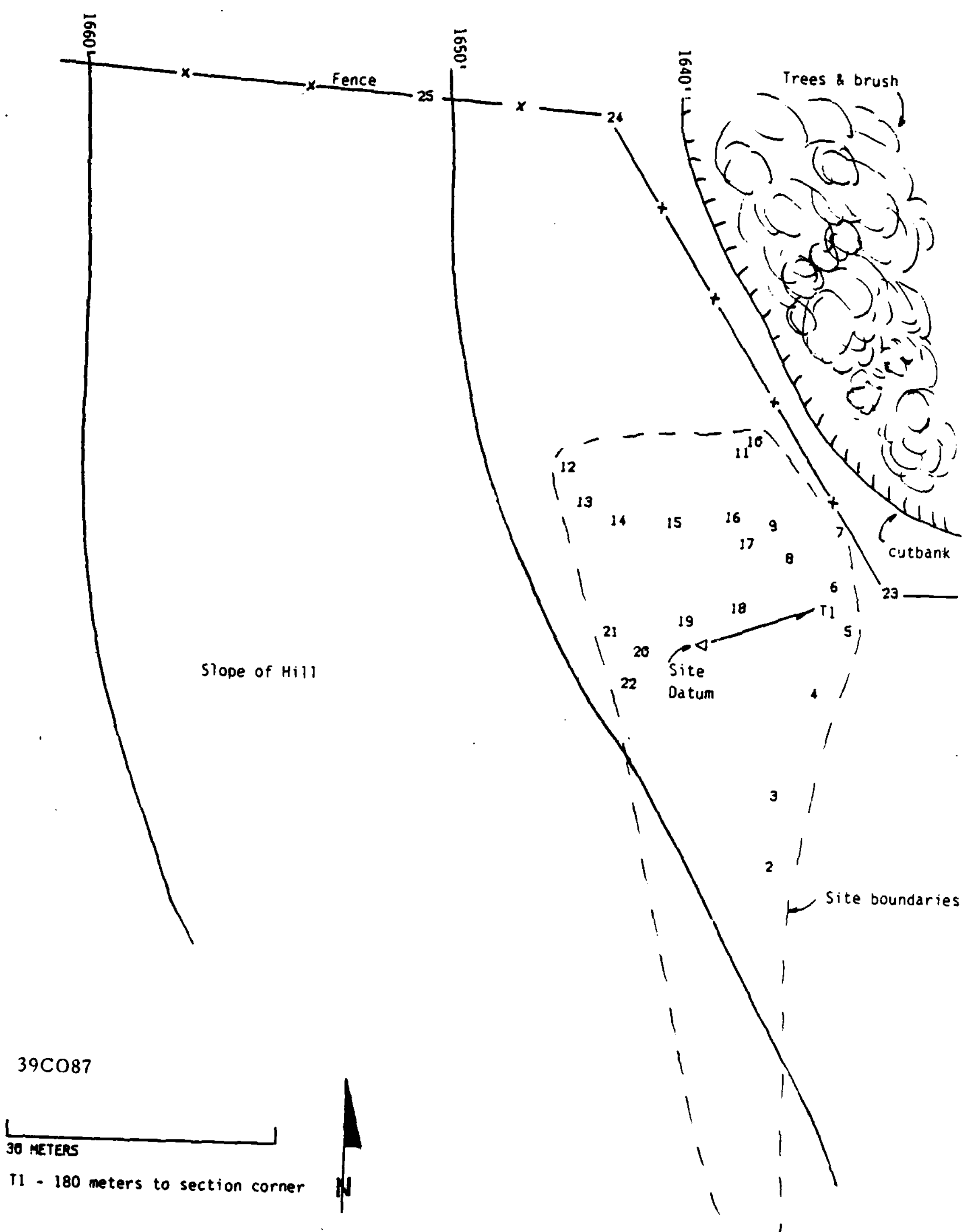

Figure 34. Map of 39CO87.

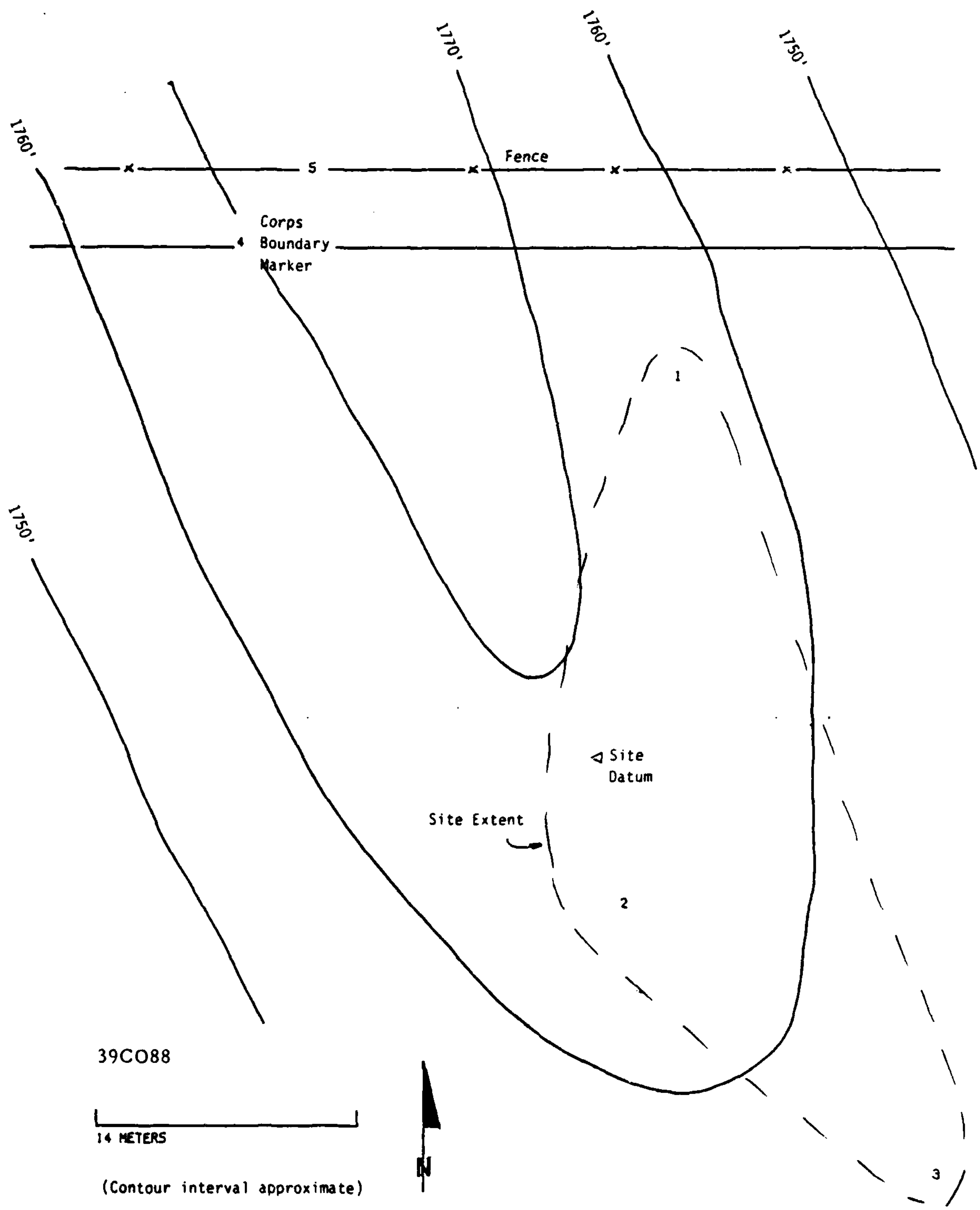

Figure 35. Map of 39C088.

low numbers and density of cultural materials. No further work is recommended.

39CO89:

This site consists of a subrectangular rock alignment situated on the upper slope of a finger ridge extending westward from a large, north-south oriented glaciofluvial ridge system. The finger ridge slopes downward to an unnamed ephemeral drainage. The entire area is covered with various prairie grasses with scattered boulder outcrops. Soil deposition is quite shallow in the area of the site.

This rock alignment is illustrated in Figure 36 and measures approximately 11 m east-west by 9 m north-south. The rocks are well-sodded in and appear to be granitic in composition. No other cultural materials were observed which could define the cultural affiliation of the feature. The alignment is suspected of being prehistoric in origin since there is no listing of a historic structure in this section from the historic documents search or on the U.S. Army Corps of Engineers 1947 War Department topographic maps. Until a determination of affiliation and function can be documented, the site must be considered potentially significant. Test excavations should be conducted to determine if any buried cultural materials are present which would answer this question as well as aid in determining the site's significance. These recommendations are a low priority since the site is not presently being impacted except by grazing.

39CO90:

This site consists of a single shallow depression on top of a V-shaped bluff with a thick paleosol containing bison bone exposed in the cutbank of the bluff at approximately 1.0-1.5 m below the surface (see Figure 37). Due to discrepancies in legal locations, this particular locale has been confused by previous River Basin Surveys investigators with the location of the White Bull Site (39CO207), an unfortified earthlodge village noted by Will and Hecker (1944:85). Some of this confusion also involved the nearby Jake White Bull site (39CO6) forcing Stanley Ahler to attempt to sort out this confusion in his report of investigations at Jake White Bull (Ahler 1977a). Ahler (1977a:11) reports that:

> Other River Basin Survey records, somewhat unclear, suggest that the White Bull site referred to by Over, Will and Hecker was probably assigned RBS site number 39CO207 in 1952, and was erroneously located...one section south of its proper location [i.e., vicinity of 39CO90]. (During the course of the current fieldwork the above legal location was searched for evidence of site 39CO207, with negative results). Furthermore, Marion Travis (personal communication) has visited a Plains Village Period site at the abandoned White Bull home place approximately one km north of site 39CO6, at a location approximately as that given in Over, Will and Hecker.
>
> In summary, it appears that there are two Jake White Bull sites. The first was reported by Over

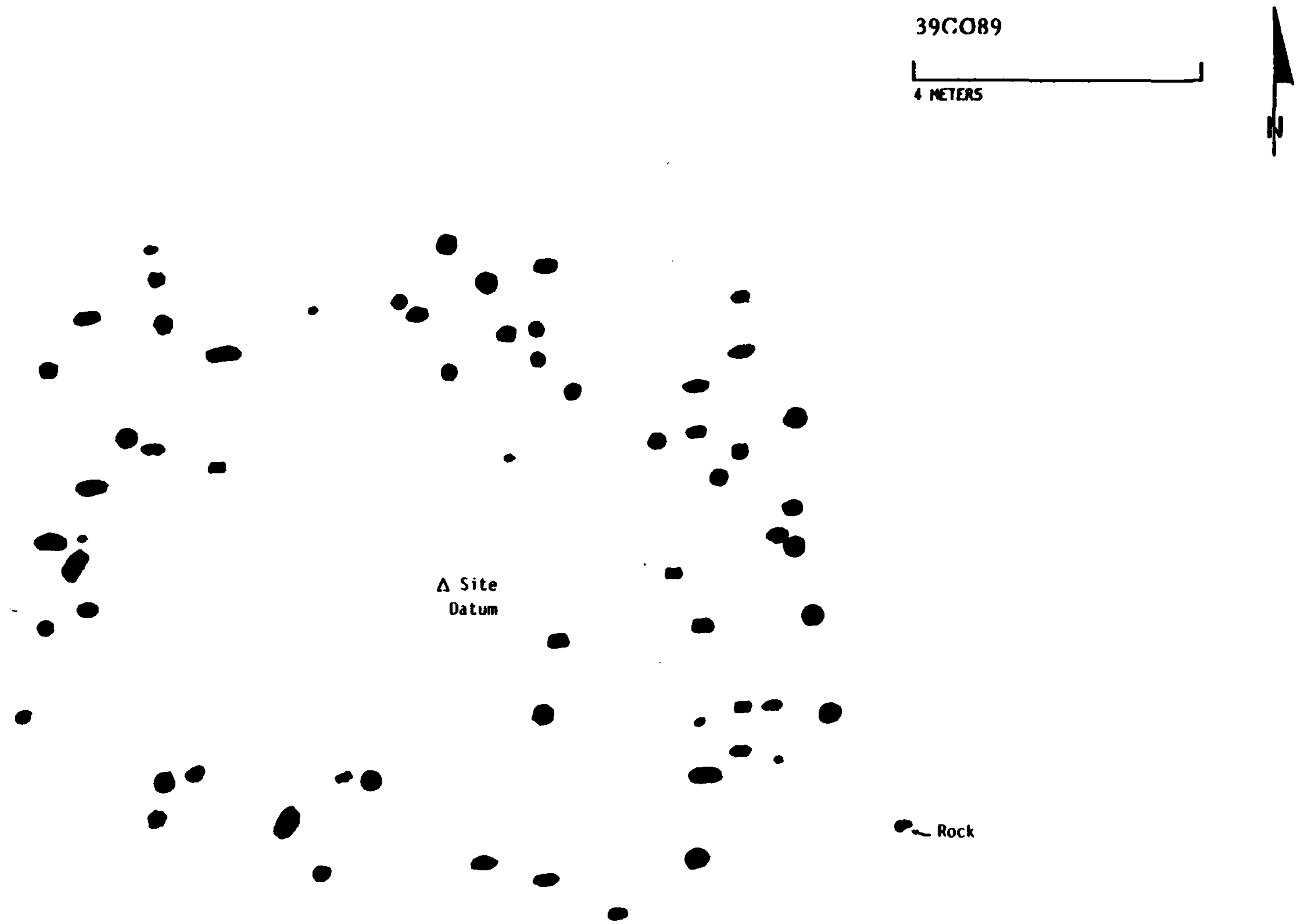

Figure 36. Map of 39CO89.

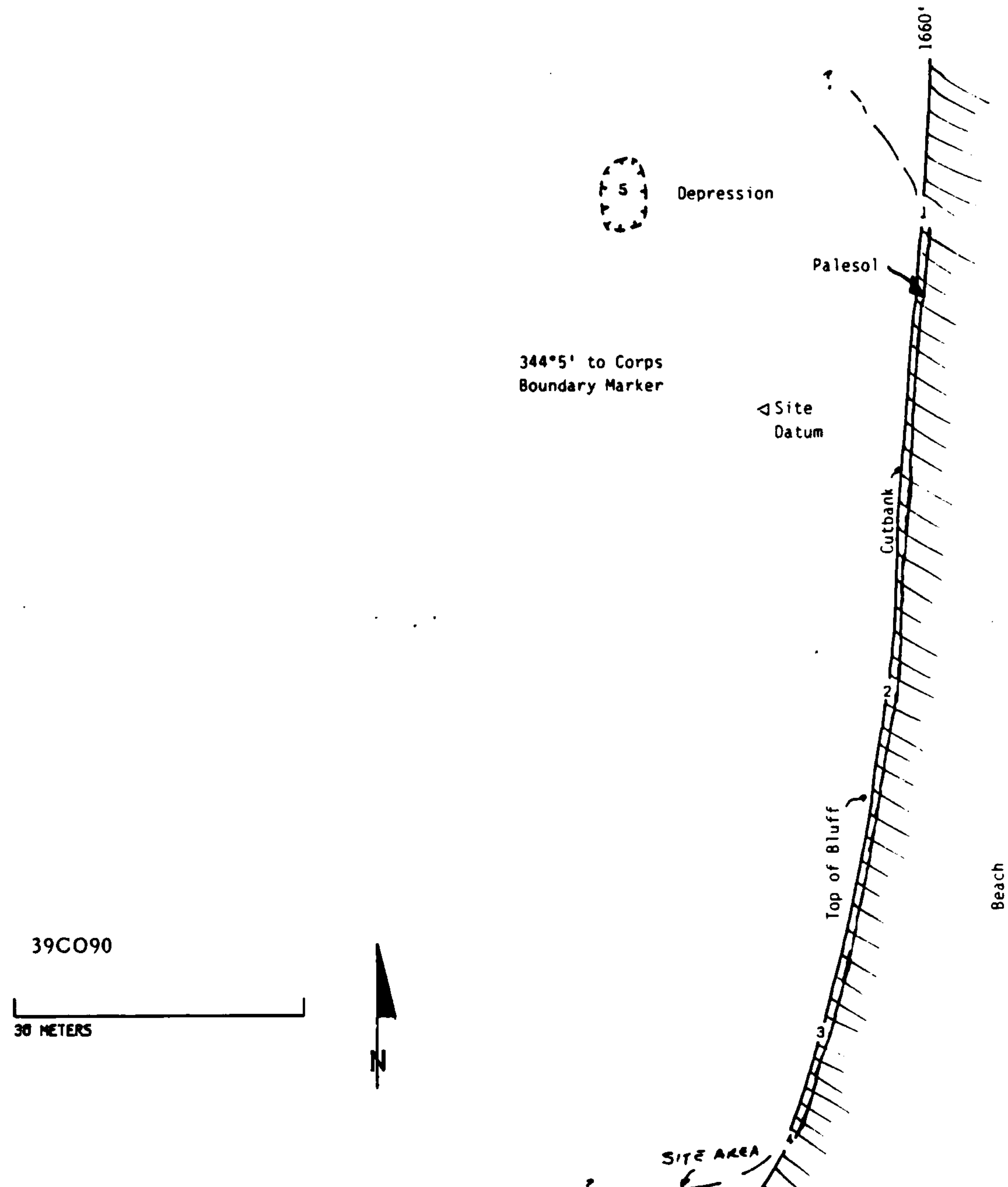

Figure 37. Map of 39CO90.

> (Sigstad and Sigstad 1973:61) and Will and Hecker (1944:85)....This site was probably visited by a River Basin Surveys field team in 1952, was apparently assigned RBS site number 39C0207, and was then erroneously given a legal description one section too far south. This site is apparently actively eroding into the Oahe Reservoir, but no systematic field work has been conducted there.

Conversations with Marion Travis and our investigations conclude that the location of 39C0207 is north of 39C06 and is inundated at the 1605' pool elevation. It also seems unlikely that the single depression at 39C090 could be confused for an unfortified earthlodge village.

The major features at 39C090 consist of a paleosol and a single depression measuring approximately 7 m north-south by 4.5 m east-west. The paleosol consists of a dark layer of soil exposed for a length of approximately 95 m in the bluff's steep cutbank. This layer is estimated to be at least 50 cm thick at its center and probably 20 cm thick at the edges of the profile. The paleosol is underlain by at least 30 m of very unconsolidated loess which prevented any close-up examination of the paleosol. However, a few bison bones were observed projecting out of the paleosol with additional elements found immediately below on the talus slope. The latter were intermixed with the darker sediment and evidently resulted from recent slumping of the cutbank.

Although no cultural materials were located which could be associated with the bison bone or the paleosol, the paleosol warrants closer examination for both cultural remains and collection of geological data. As a result the site should be considered potentially eligible for nomination to the National Register of Historic Places. Test excavations are recommended to determine the site's significance and should be geared towards determining the nature of the single depression on top of the bluff and the potential of the paleosol for containing buried cultural deposits. These recommendations should be considered a high priority due to the susceptibility of the loess to erosion by wave action above the 1610 foot pool elevation.

39C091:

This site consists of ten stone circles and a large rock cairn (see Figure 38). These features are located on the eastern side of the same large ridge as 39C089 discussed earlier. Site 39C091 is located on a narrow finger ridge extending eastward from the large, north-south oriented ridge. The eastern end of the finger ridge has been truncated by wave action from Lake Oahe producing a steep cutbank. This erosion has also partially destroyed the easternmost stone circle. No cultural materials were observed in the cutbank or at its base.

The ten stone circles are arranged in a linear pattern occupying an area approximately 25 m north-south by 100 m east-west. However the overall site area (north-south dimension) should be increased to 50 m since cultural materials may be present under the thick prairie grasses covering the ridgetops. The rocks composing the circles are well-sodded in with the circles varying between 4 and 6 m in diameter. The rock cairn is

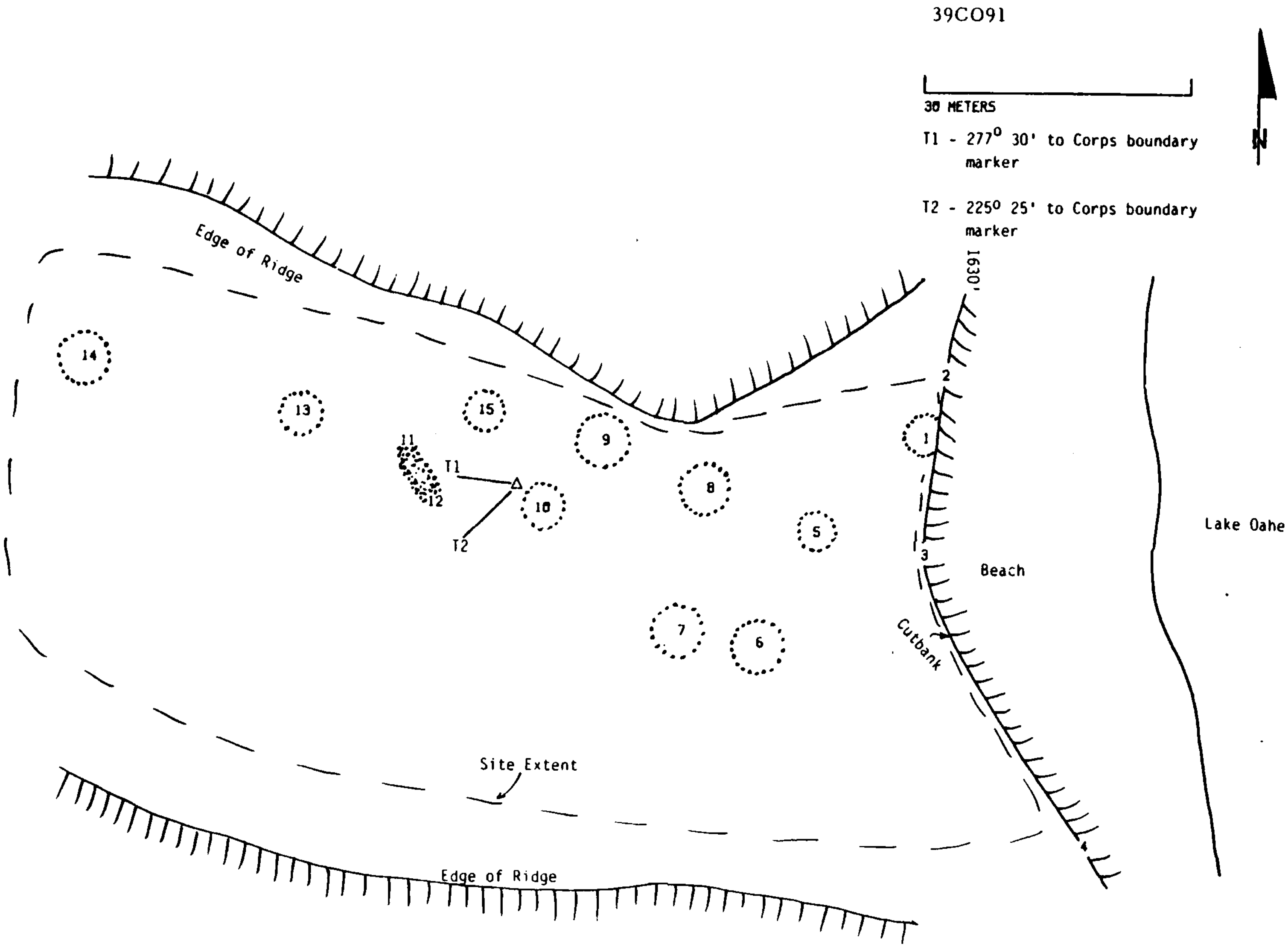

Figure 38. Map of 39C091.

approximately 7 by 3 m in size. The center of the rock cairn is partially hollowed-out and may have been previously disturbed by pothunters.

This site should be considered potentially eligible to the National Register of Historic Places since additional information is necessary to determine the site's significance. Test excavations are recommended to investigate if other cultural remains are buried beneath the sod layer and associated with the stone circles. Test excavation of the rock cairn should also be conducted to determine its function and relationship to the other features on the site. One of the primary research goals of these investigations should be the recovery of information enabling a determination of cultural affiliation and chronological placement. Since stone circle sites are most often associated with nomadic Plains hunter-gatherers (cf. Frison 1978; Kehoe 1960; Davis 1983 or Zimmerman 1985), this site could provide valuable information on potential relationships between these groups and local Plains Village sites.

39CO92:

This site consists of two small rock cairns located approximately 50 m apart on a narrow ridge (see Figure 39). The ridge extends northeastward from a large hill towards Lake Oahe. Narrow draws (containing various hardwoods, shrubs and prairie grasses) border the ridge to the northwest and southeast. Above these draws, a thick covering of prairie grasses occurs.

Cairn 1 is composed of 23 observed rocks in a area one meter in diameter. A depression was observed in the center of the cairn suggesting that it may have been previously disturbed. No disturbance was noted of Cairn 2 which consists of 13 rocks in a area two meters in diameter. The rocks of both cairns are well-sodded in and additional rocks may be present below the sod. Thus it is possible that the cairns maybe larger than their surface dimensions suggest. No other cultural materials were observed at this site.

Test excavations are recommended to establish the site's significance in terms of function, content, cultural affiliation and chronological placement. Until this information is collected this site should be considered potentially eligible for nomination to the National Register of Historic Places. These recommendations can be considered a low priority since the site is not presently being impacted, except for grazing, and is located in a relatively inaccessible area. Additional information concerning the functions of these cairns is presented in Chapter Eleven.

39CO93:

The cultural materials at this site all occur on the beach of Lake Oahe along an area approximately 320 m north-south by 80 m east-west (see Figure 40). The majority of the cultural materials occur where the bottom of a small wooded valley joins Lake Oahe. The site is bounded on the south by a large hill and a steep cutbank on the west. The cutbank varies between 2 and 10 m in height but no cultural materials were observed in the cutbank profile. Since all of the cultural materials were located on the beach, this site would be inundated at the 1610 foot pool elevation.

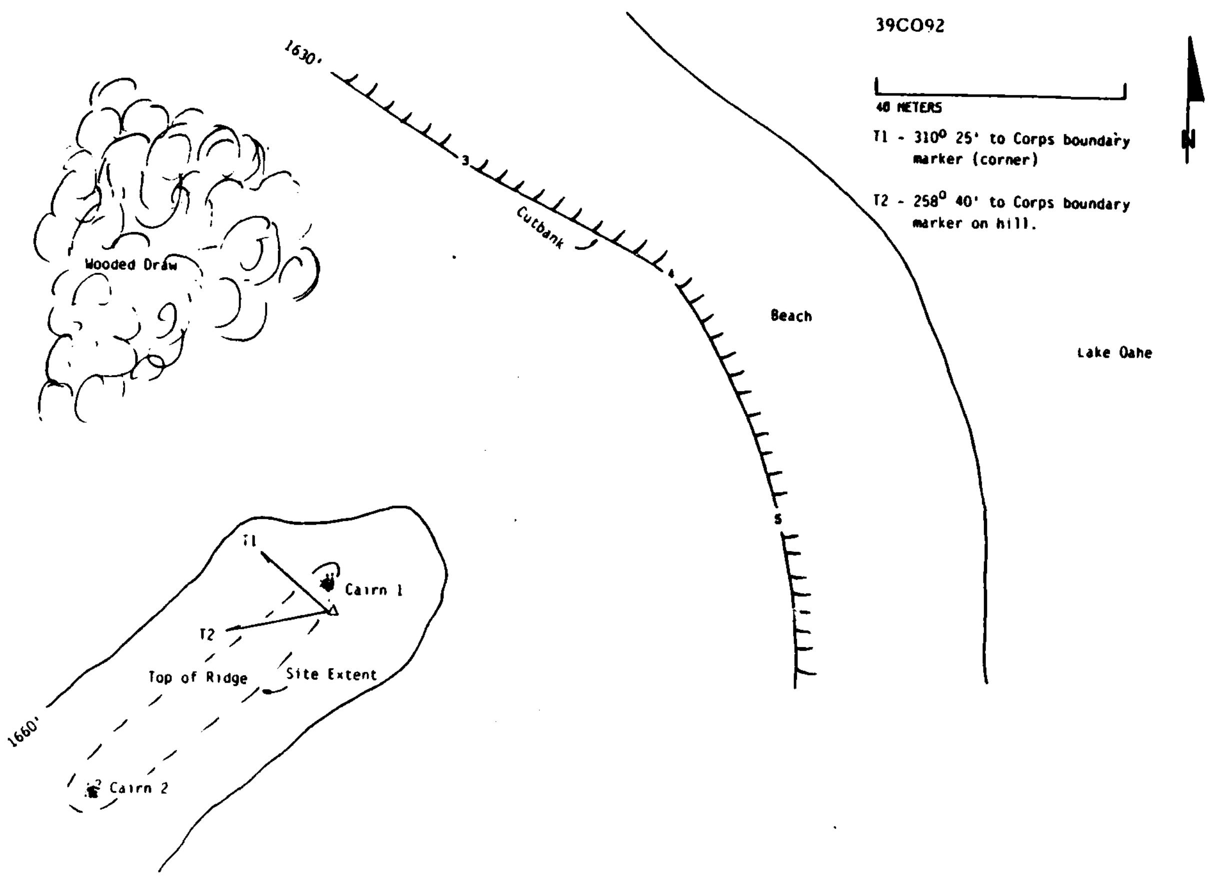

Figure 39. Map of 39C092.

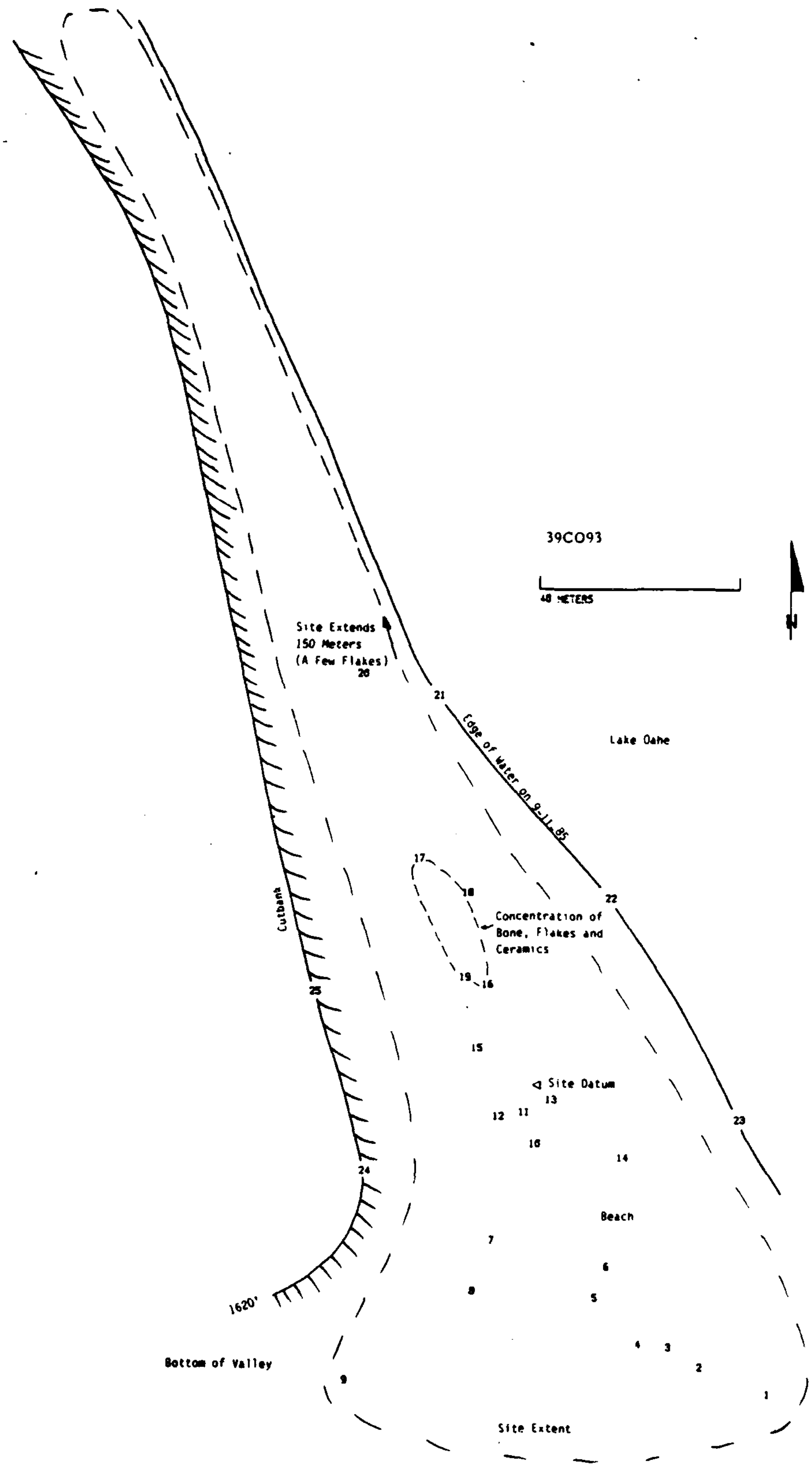

Figure 40. Map of 39CO93.

The cultural materials consist of numerous flakes of Knife River flint, 2 retouched flakes, 3 projectile points (see Figure 31 c-d), bone fragments, rim sherds and tool-incised, simple stamped and smooth body sherds. The collected ceramics are comparable to Riggs and Fort Yates wares indicating an affiliation with the Middle Missouri Tradition. Although one concentration of bone, flakes and body sherds was observed, the overall density of cultural materials is relatively low. The effects of wave action have basically destroyed the integrity of the site, therefore the site is recommended as not eligible for nomination to the National Register of Historic Places.

39CO94:

This site consists of two rock cairns along a ridge and is basically identical to 39CO92 (see Figure 41). The cairns are located on two small knolls approximately 100 m apart along a north-facing slope of a ridge. Nearby draws contain hardwoods and shrubs with the remaining landforms generally covered by prairie grasses.

Both cairns consist of well-sodded in rocks and range in size from one to two meters in diameter. The northernmost cairn designated Cairn B has been slightly impacted by slumping. Additional erosion could yield information on cairn construction or contents provided that the slumping does not destroy the cairn entirely.

As with site 39CO92, test excavations are also recommended at this site to determine it's significance. An alternative, however, may be monitoring the erosion of Cairn B and recording any details provided by any newly formed profiles. Until sufficient information is obtained on function, cultural affiliation and chronological placement, the site must be considered potentially eligible for nomination to the National Register of Historic Places.

39CO95:

This site consists of a diffuse artifact scatter which occurs on the former southern terrace along John Grass Creek (see Figure 42). This terrace is inundated at the 1610 foot pool elevation and is therefore subject to erosion and disturbance from Lake Oahe. During the time of the present investigation, the terrace surface was comprised of a mudflat covered with scattered weeds.

The cultural materials consist of 9 flakes of Knife River flint and Smooth Grey Tongue River Silicified Sediment, 1 hammerstone, 1 retouched flake, fire-cracked rocks and 6 smooth body sherds scattered over an area measuring approximately 20 m north-south by 70 m east-west. The body sherds are suggestive of a Plains Village association. Wave action and inundation has apparently destroyed the original context of these materials. As a result, this site is not considered eligible for nomination to the National Register of Historic Places.

39CO96:

This artifact scatter is also located on the beach of Lake Oahe which was formerly a terrace on the south side of Hunkpapa Creek (see Figure 43).

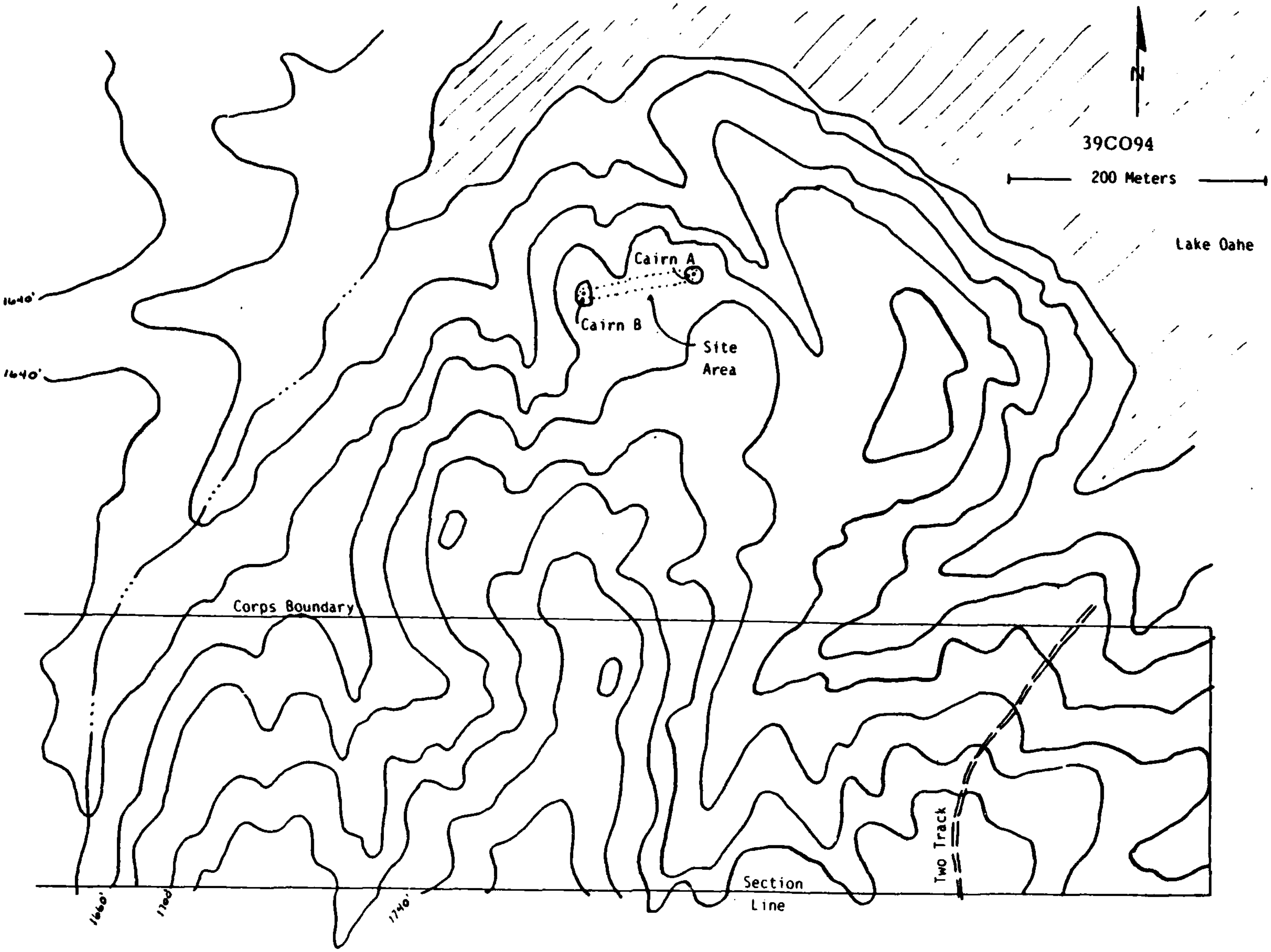

Figure 41. Map of 39C094.

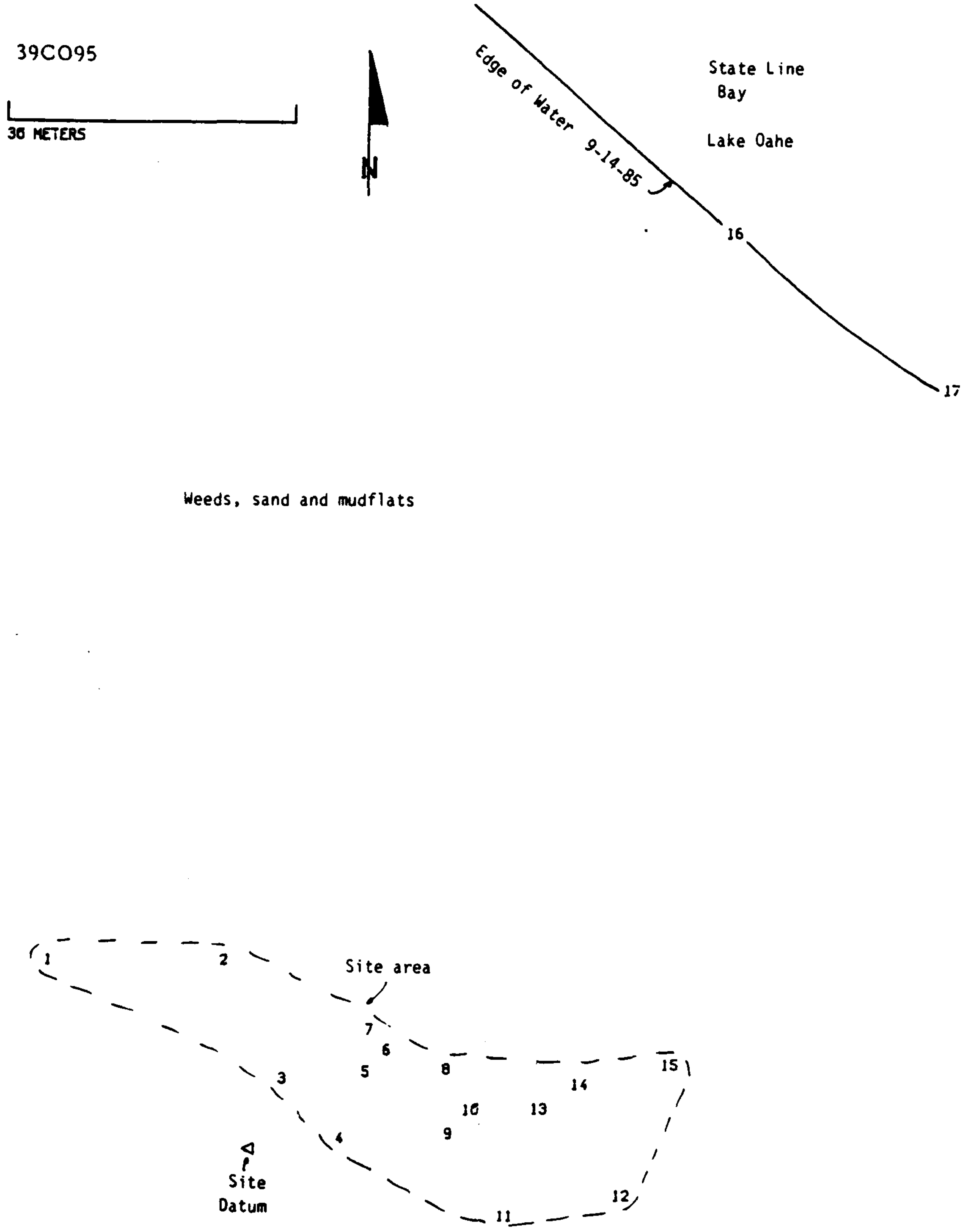

Figure 42. Map of 39CO95.

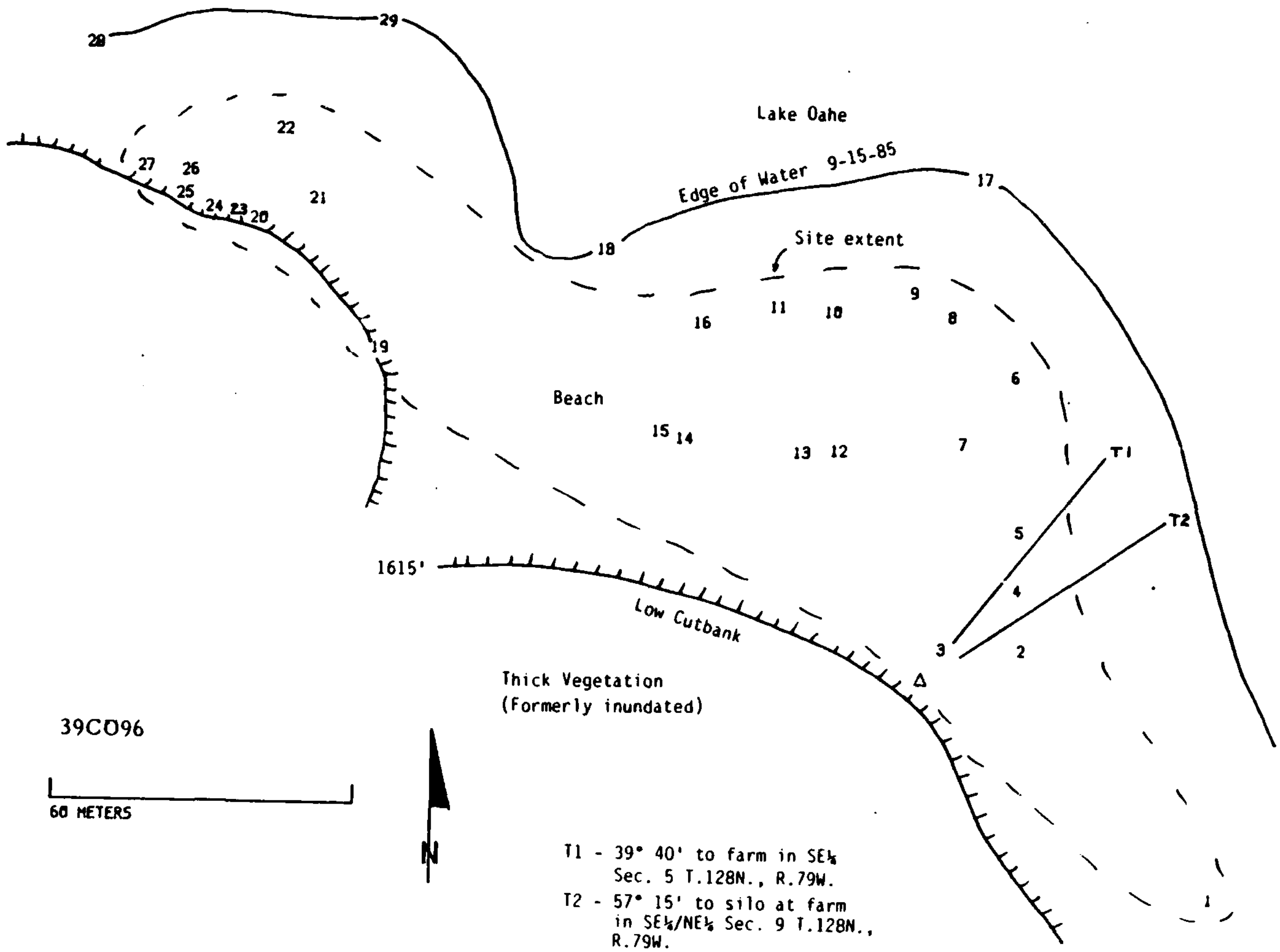

Figure 43. Map of 39CO96.

The site and the surrounding area is inundated at the 1610 foot pool elevation. Wave action has cut into the northern edge of the terrace producing a 50 cm high cutbank and a wide scatter of cultural material on the beach. The cultural materials include 29 flakes, 1 biface, 2 cores, 1 chopper, 1 bone fragment, 1 tool-incised rim sherd (see Figure 31 e) and tool incised and smooth body sherds. Knife River flint and Yellow/Red and Smooth Gray Tongue River Silicified Sediment are the dominant raw materials within the assemblage. The rim sherd is suggestive of Extended Coalescent La Roche wares (cf. Stephenson 1971).

As noted above, most of the cultural materials are scattered over an area which measures approximately 270 m east-west by 60 m north-south. One concentration of artifacts was observed along the cutbank in the northwestern edge of the site. An examination of this cutbank failed to find any cultural materials exposed in the profile or any sedimentary distinctions which may have pinpointed their origin. Given this and the fact that these artifacts occur along approximately 25 m of the 50 cm high cutbank suggests that substantial buried cultural deposits are not present. If cultural materials are buried within the cutbank, the evidence would tend to indicate an artifact density similar to that along the cutbank or approximately one per square meter. It seems unlikely that additional work would recover any information which would significantly add to this site. As a result, this site is not considered eligible for nomination to the National Register of Historic Places.

39CO97:

This site is located approximately 400 m southeast of 39CO96 in a nearly identical environmental setting. The cultural materials at this site are also located on the beach of Lake Oahe but are fewer in number and more widely dispersed (see Figure 44). The site area measures approximately 120 meters north-south and 100 m east-west. No concentrations are evident although a wide variety of cultural materials are present. These include 6 flakes, two biface tips, a retouched flake, bone fragments and a complete side notched Besant projectile point (see Figure 31f). Knife River flint dominates the artifact assemblage. Two historic items were also mapped on the site, consisting of a rusted chain and a .45 caliber bullet. These items are probably intrusive and associated with the historic site to the south or with recreational activities along Lake Oahe.

All of the cultural materials were located on the beach and lack any integrity. No cultural materials were observed along the cutbank and buried cultural deposits are evident. As a result, the site is considered not eligible for nomination to the National Register of Historic Places and no further work is recommended.

39CO98:

The cultural materials comprising this site are located on a high bluff overlooking the Oak Creek valley and Lake Oahe (see Figure 45). The bluff top and slopes are covered with prairie grasses which have been impacted by grazing. The cultural materials consist of 14 flakes, a retouched flake, 2 fire-cracked rocks and a 3.5 m diameter depression which are widely scattered over an area measuring approximately 70 m north-south by 40 m

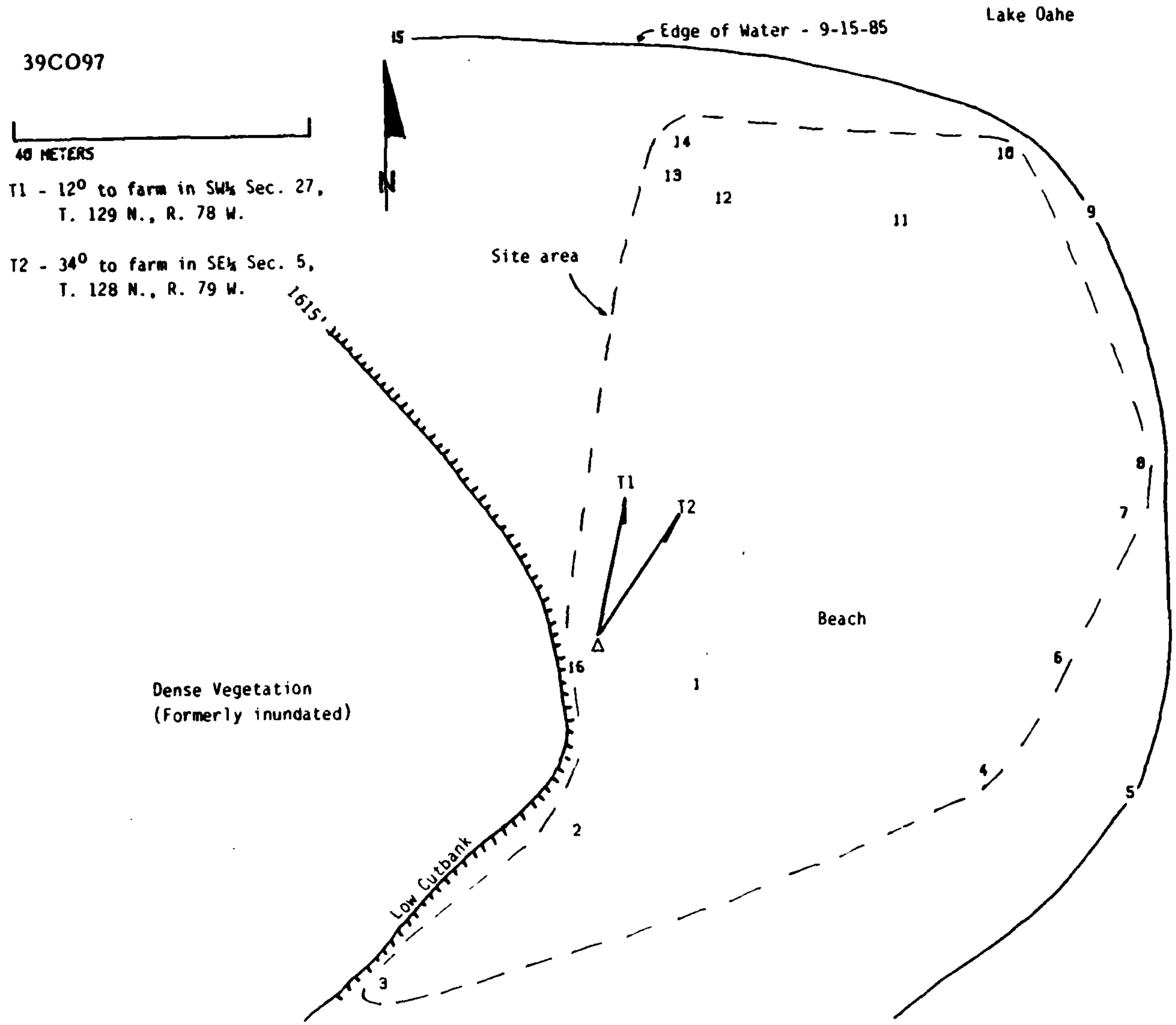

Figure 44. Map of 39C097.

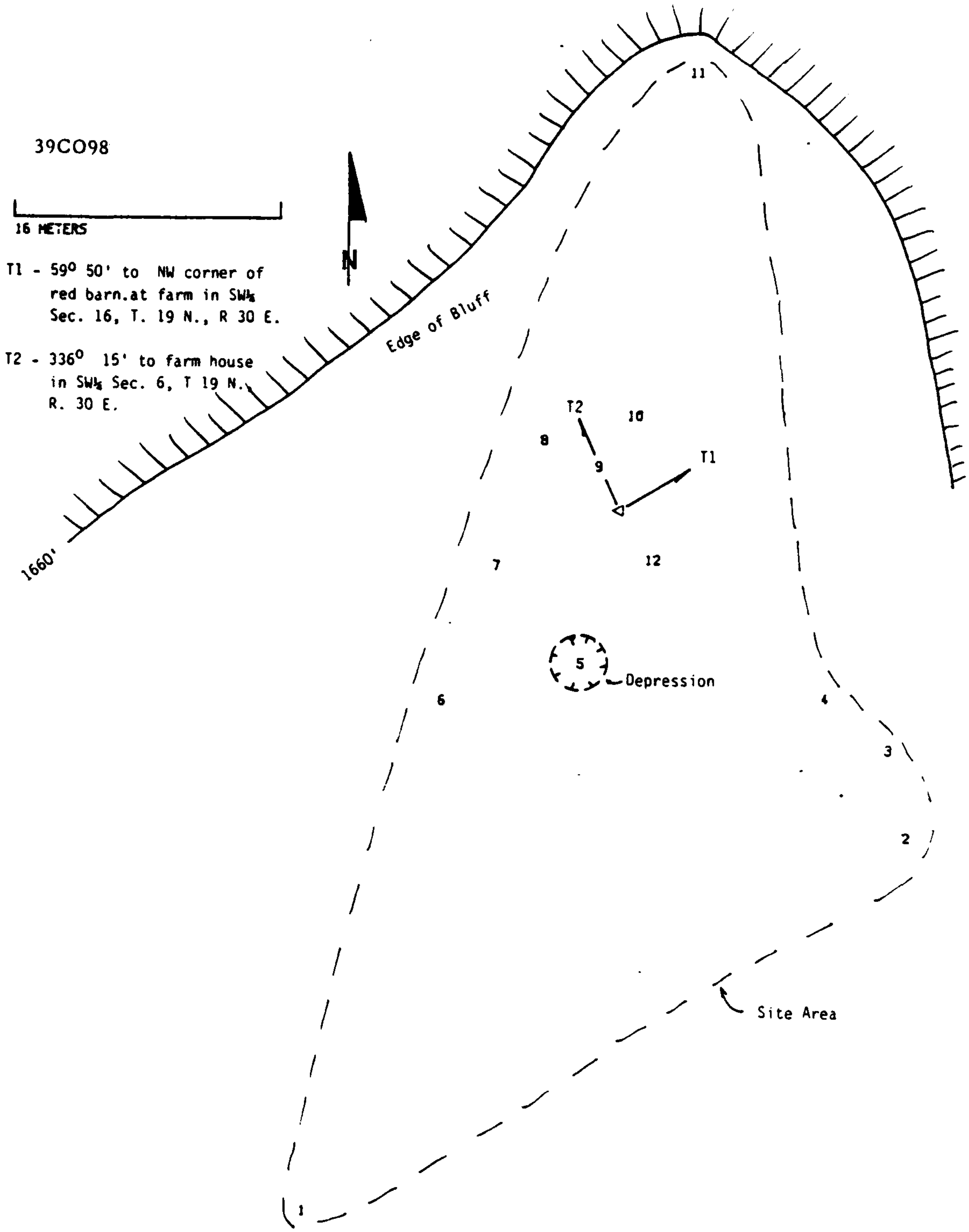

Figure 45. Map of 39CO98.

east-west. A wide variety of raw materials are present within the artifact assemblage.

The depression may be the most significant feature of the site and should be test excavated to determine its function and cultural and chronological affiliation. Until such questions are answered, the site should be considered potentially eligible for nomination to the National Register of Historic Places.

39CO99:

This site is located approximately 500 m southeast of 39CO98 along the edge of the same high bluff (see Figure 46). The site overlooks Lake Oahe to the east and the former confluence of Oak Creek and Missouri River. The surface of the bluff along the edge is sparsely covered with short prairie grasses which appear to have been overgrazed resulting in some erosion.

Cultural materials have been exposed along the edge of the bluff in an area measuring approximately 55 m north-south by 5 m east-west. Three concentrations of flakes and bison bone occur in this area along with scattered flakes and stone tools. Although the steepness of the bluff cutbank prevented any examination for buried cultural deposits, the surface concentrations indicate that additional shallowly-buried cultural materials are a high probability.

Test excavations are recommended to determine if additional buried cultural deposits are present and their extent, age, characteristics and overall significance. As a result the site should be considered potentially eligible for nomination to the National Register of Historic Places. These recommendations should be considered high priority due to the rapid slumping of the bluff edge and site caused by wave action.

39CO100:

The cultural materials of this site are limited to four flakes located along the top of a ridge (see Figure 47). This ridge is situated on the north-facing slope of a highly dissected bluff which overlooks the Oak Creek valley and Lake Oahe. Vegetation consists of a general covering of prairie grasses with various scattered shrubs and trees in the draws. Other than grazing, the main disturbance to the bluff slope is the railroad grade which bisects this slope and many of its ridges. The site is located immediately above the railroad grade which has truncated the ridge.

The cultural materials of this site consist of three Knife River flint flakes and one Tongue River Silicified Sediment flake which occur in a one meter diameter area. Although the condition of the site is good, no other cultural materials were observed and the site is believed to have a low potential for containing any additional significant buried cultural deposits. This site is, therefore, recommended as being not eligible for nomination to the National Register of Historic Places.

39CO101:

This site consists of a small, Late Prehistoric period side or corner-notched projectile point fragment of white chert and a Knife River flint

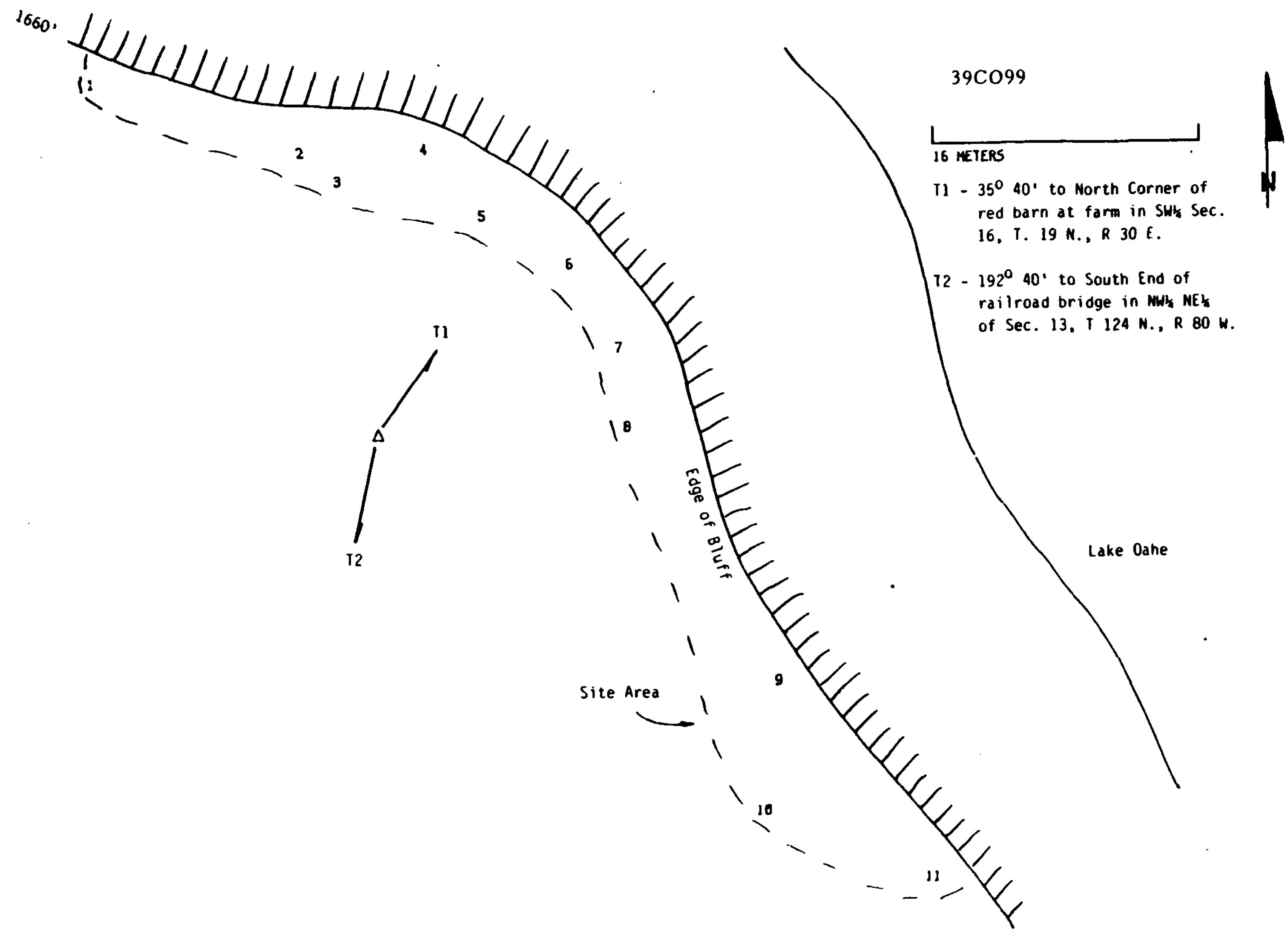

Figure 46. Map of 39C099.

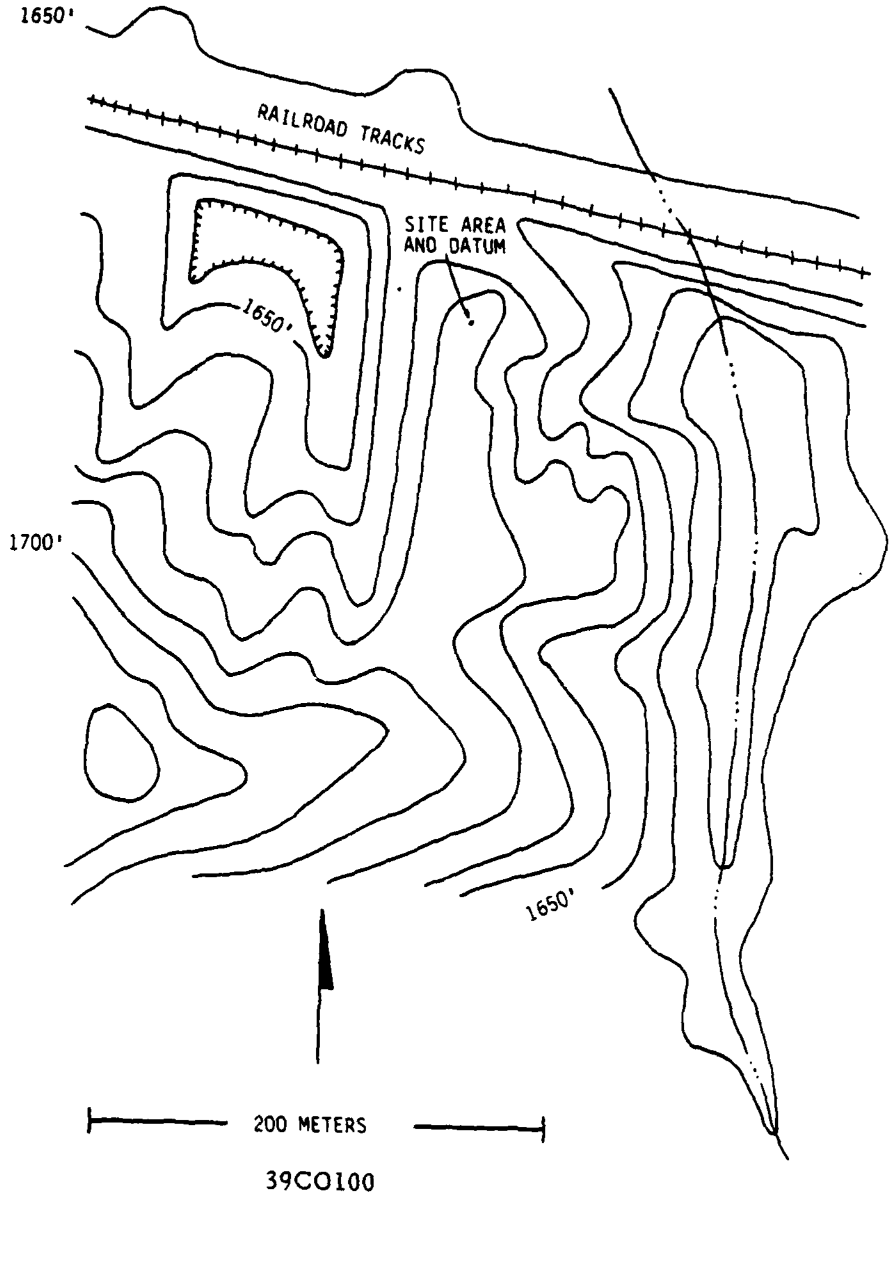

Figure 47. Map of 39CO100.

core located six meters apart at the base of a high bluff (see Figure 48). The site area is along the north bank of the Grand River where the river enters Lake Oahe. Although this particular area is near the high pool elevation for Lake Oahe, the presence of adjacent undisturbed native riparian vegetation indicates that inundation has been rare and of short duration.

Although ground visibility is estimated at 75 percent no other cultural materials were noted. The low density and number of cultural materials suggests that the site has a low potential for containing any additional significant cultural deposits. The site should therefore be considered not eligible for nomination to the National Register of Historic Places.

39CO102:

This artifact scatter is situated on a high bluff overlooking Lake Oahe and the Grand River valley to the north (see Figure 49). The site consists almost entirely of flakes, bone and fire-cracked rock exposed along a minimum of 300 m of cutbank at the bluff's edge. This 2-3 m high cutbank was exposed by massive slumping of the bluff slope. The mounded topography of the slope and its covering of various trees and shrubs suggests that slumping has occurred frequently in the past. Slumping has also probably been accelerated due to wave erosion of the bluff base. The surface of the bluff has been subjected to cultivation except for its margins which are covered with prairie grasses.

Except for one flake located in the cultivated field the remaining cultural materials occurred along the cutbank. These materials were observed on the surface and at varying depths below the top of the cutbank. All of the in situ cultural material occurred within the upper 50 cm while items found below this had apparently fallen out of the cutbank and were located on the talus. At approximately two meters below the surface, a paleosol occurs in the cutbank profile. The 30-40 cm thick paleosol overlies various sands and gravels suggesting an early date for its formation. No cultural materials were observed within the paleosol, however only a limited exposure is present. Nonetheless, the paleosol is important not only as a stratigraphic time marker, but also due to its potential to contain preceramic and possibly Paleoindian age cultural materials which are rarely found in the Middle Missouri subarea.

The buried cultural level or levels within the upper 50 cm of the cutbank can also provide information on the prehistory of the region. The majority of these materials consist of faunal remains and fire-cracked rocks. This suggests that butchering and/or processing of large mammals took place at this locality. Specialized faunal utilization sites, such as this, are important due to their potential resource procurement relationships with the large habitation sites along the Missouri River. In order to investigate this potential relationship and the overall significance of the site, test excavations are necessary to determine the site's subsurface extent, cultural affiliation and/or chronological placement. Additional investigation of the deeply buried paleosol should also be conducted to determine if associated cultural materials are present and to collect geomorphological data. These investigations could include cleaning of cutbank exposures for visual inspection and soil sample collections as well as test excavations. Until such investigations are

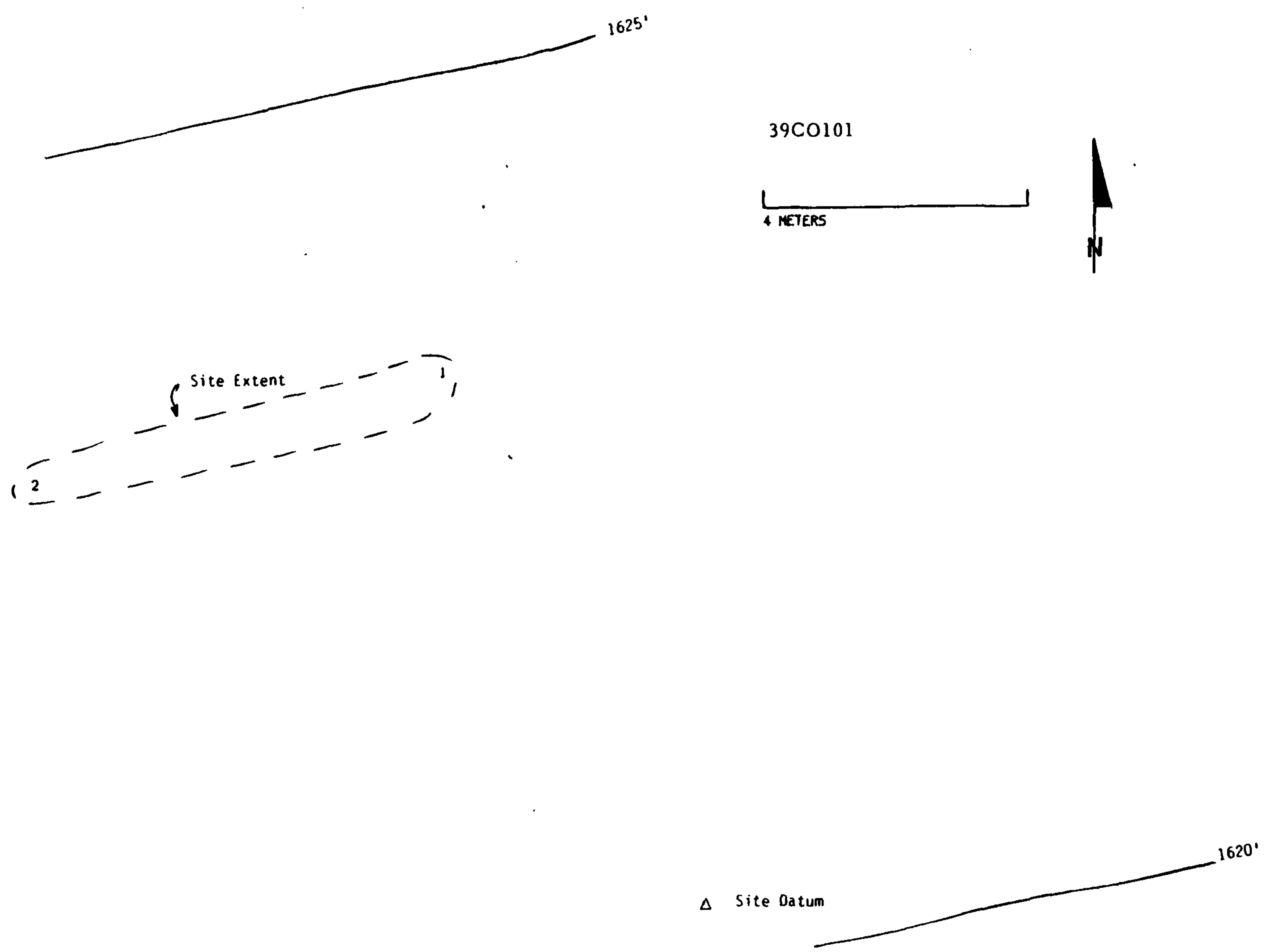

Figure 48. Map of 39CO101.

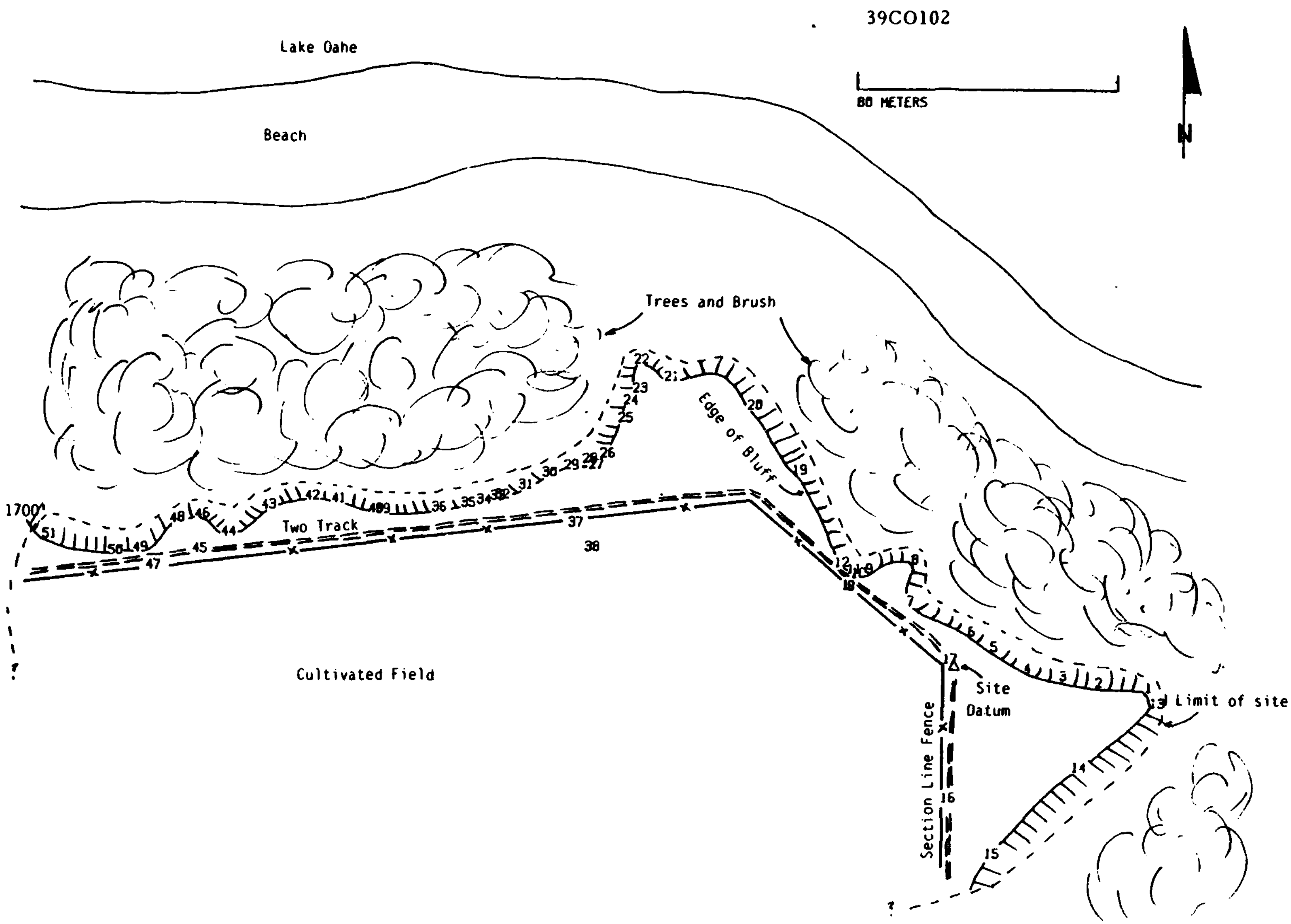

Figure 49. Map of 39CO102.

conducted the site should be considered potentially eligible for nomination to the National Register of Historic Places. Although the rate of erosion due to slumping is not exactly known these recommendations should be given a high priority.

39C0103:

This artifact scatter is located on the top and edge of a high bluff overlooking Lake Oahe and the former Grand River valley to the west (see Figure 50). A fence and two track road divides the site into undisturbed prairie grasses to the west and a cultivated field to the east. Although a relatively higher density of cultural materials occurs in the western portion of the site, the low density of cultural remains in the cultivated field suggests that subsurface cultural deposits are sparse. Cultural materials at the site include a number of flakes, 2 cores, 1 retouched flake, 1 end scraper, 1 fire-cracked rock and a McKean Complex projectile point fragment. The projectile point, which is missing its tip, has wide, shallow side notches and an indented base, similar to the Duncan type variant (see Figure 51 a). A wide variety of raw material types are present within the artifact assemblage but the majority are Knife River flint.

Overall, these cultural materials are widely scattered over an area measuring approximately 115 m north-south by 70 m east-west. As noted above, if substantial buried cultural deposits were present, the cultivation should have uncovered them. This suggests that significant buried cultural deposits are not present and the site has little potential to contribute any additional significant information on the prehistory of the region. Therefore, the site should be considered not eligible for nomination to the National Register of Historic Places.

39C0104:

This small artifact scatter consists of 10 flakes located in a 10 by 8 m area. The site is situated on a low knoll on the crest of a narrow finger-ridge extending southeastward from a high bluff along Lake Oahe (see Figure 52). The site is on the south-facing slope of the former Grand River valley. Vegetation consists of prairie grasses with scattered shrubs in the neighboring draws. Other than grazing, the site is in good condition.

The flakes are comprised of six Knife River flint and four agate/chalcedony. The lack of stone tools, bone fragments or fire-cracked rock and overall low density of cultural materials suggests that the site functioned as a temporary specialized lithic reduction locale with little potential for any more substantial cultural remains. The site is considered to have little potential for yielding any additional significant information on the prehistory of the region and is recommended as not eligible for nomination to the National Register of Historic Places.

39C0105:

This site consists of a small concentration of bone fragments and approximately 30 flakes eroding out of the edge of an abandoned gravel pit (see Figure 53). The site is located on a high bluff above Lake Oahe,

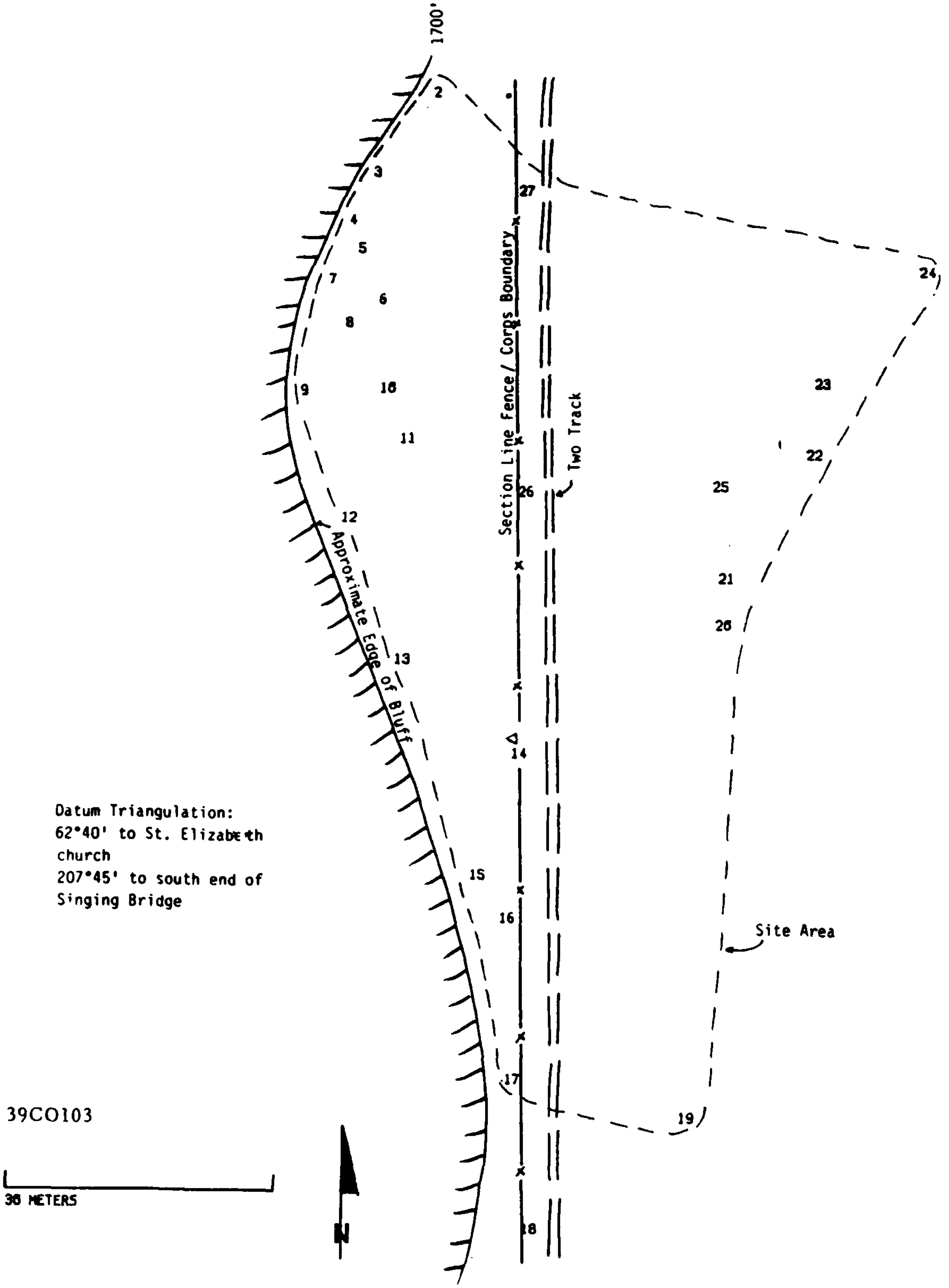

Figure 50. Map of 39CO103.

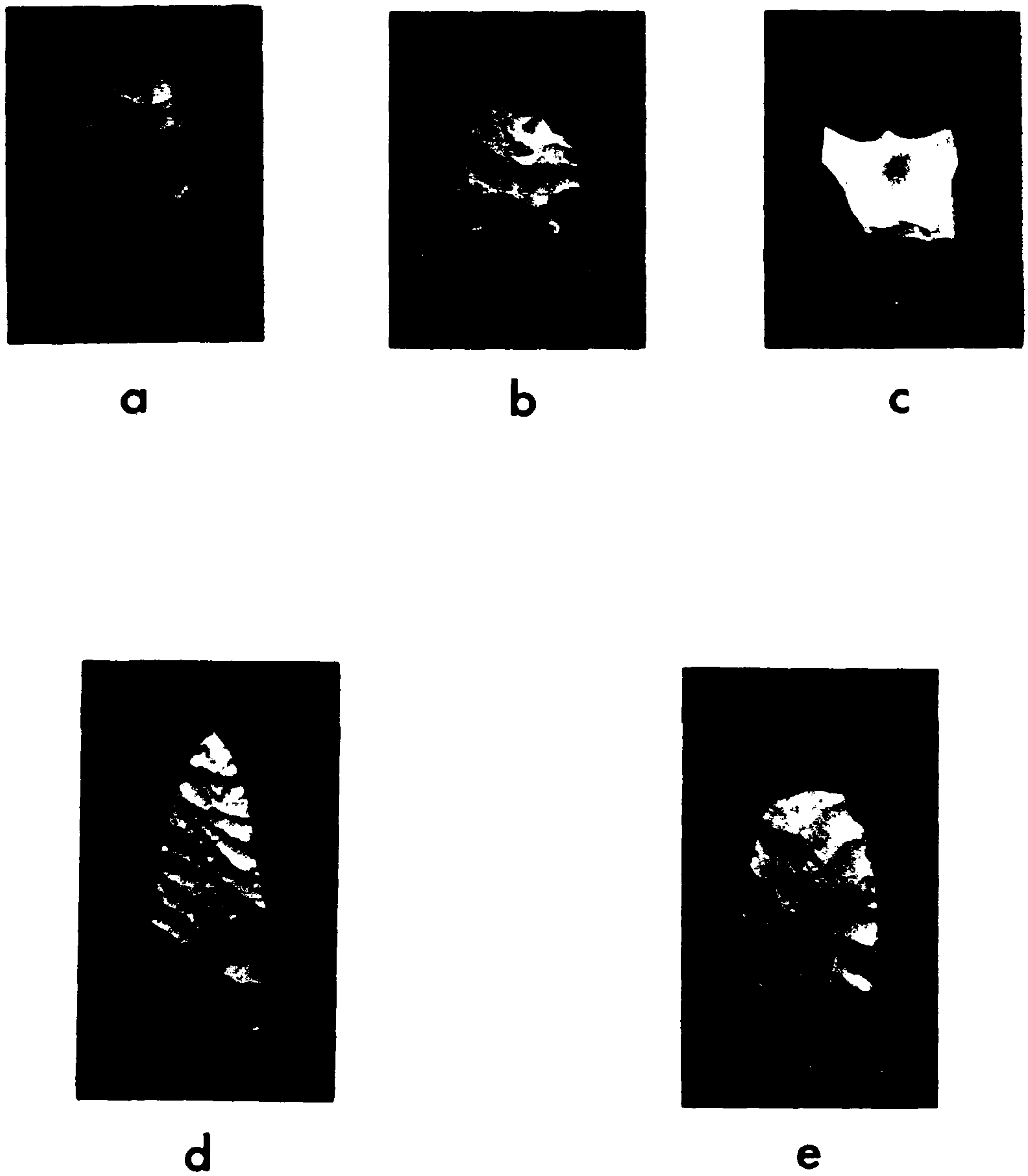

Figure 51. Artifacts from site 39C0103 (a) and isolated finds: a-McKean projectile point; b-Pelican Lake corner notched projectile point (39C0111); c-European gunflint (39C0112); d-possible reworked Late Paleoindian projectile point (39C0113) and e-possible Early Plains Archaic side notched projectile point (39C0114).

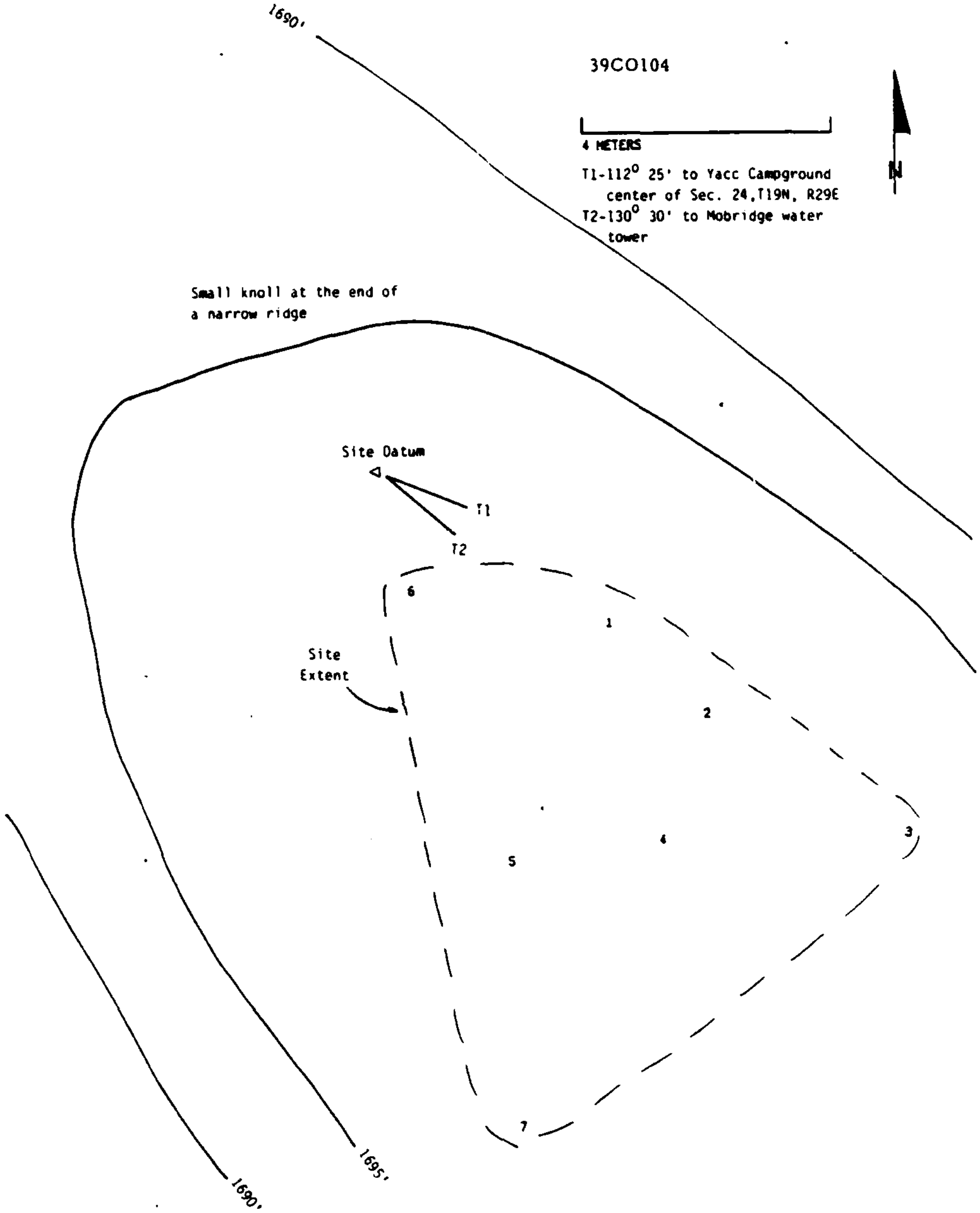

Figure 52. Map of 39CO104.

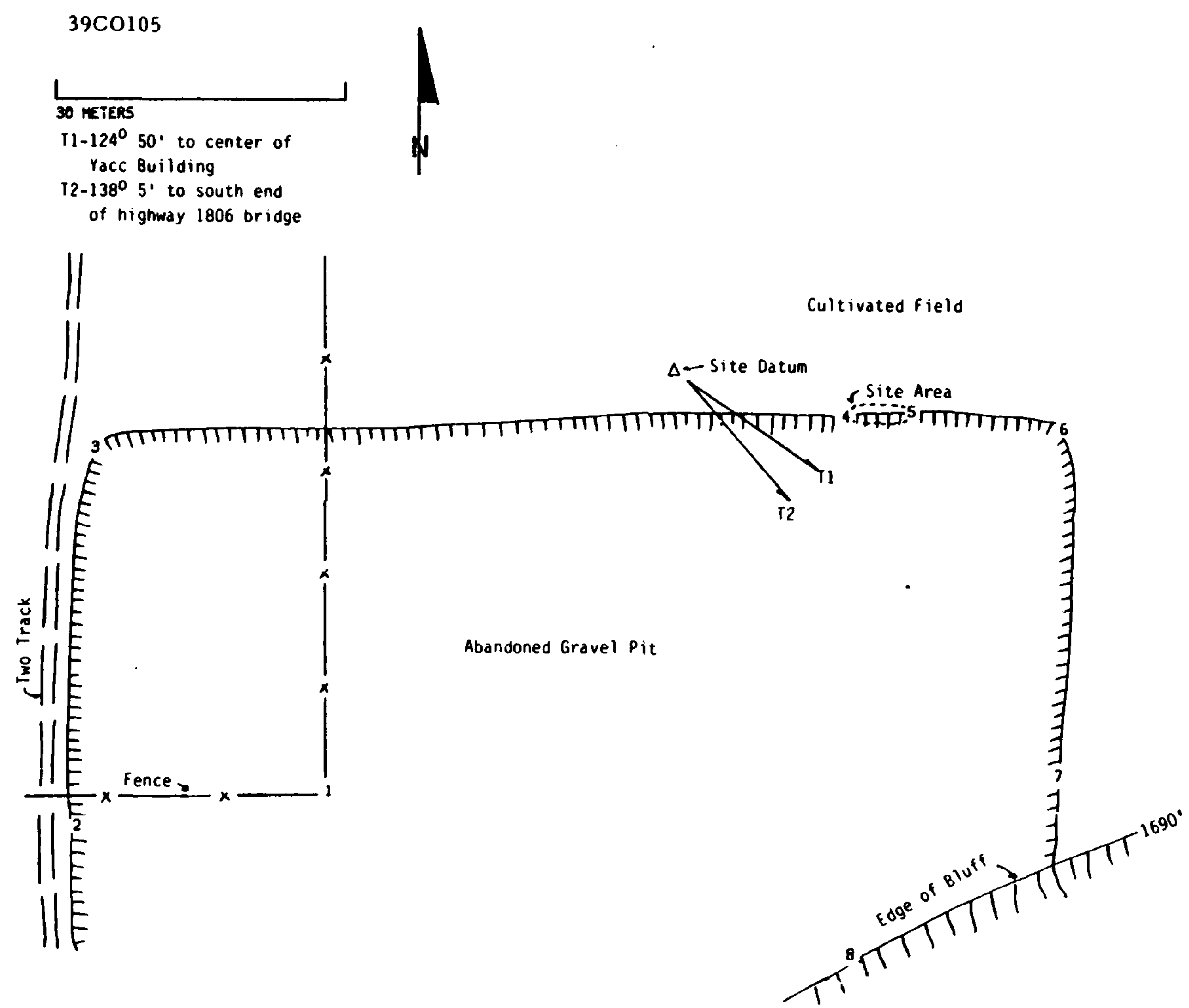

Figure 53. Map of 39CO105.

approximately 50 m north of the bluff edge. Vegetation within the abandoned gravel pit consists of various native and introduced plants, while much of the remaining bluff top is in cultivation. The area immediately to the north of the site was in summer fallow in 1985 and had very limited surface visibility.

The cultural materials were found eroding from the edge of the gravel pit at a depth of approximately 20 centimeters below the surface. All of the materials occur within a 5 meter area. The limited spatial distribution of these materials and their origin from a buried level suggests that additional potentially significant buried cultural materials are likely. Test excavations are recommended to investigate the subsurface extent and characteristics of the cultural deposit including content, cultural affiliation and chronological placement. The data could also be gathered from additional surface investigation when the adjacent field has been plowed. Since the cultural materials occur approximately 20 cm below the surface, normal cultivation could expose additional materials from this buried level. In general, this site should be considered potentially eligible for nomination to the National Register of Historic Places.

39C0106:

The cultural materials at this site are located on the western edge of a bluff approximately 30 m above Lake Oahe (see Figure 54). The site formerly overlooked the Grand River valley to the west and is located approximately 3 miles upriver from the confluence of the Grand and Missouri rivers. The site area is covered by various prairie grasses with occasional pockets of shrubs in the adjacent draws. Ground surface visibility was estimated at 70 percent.

The cultural materials at this site occur in the ruts of a two track road and concentrated in an area measuring approximately 2.5 by 5 m. The latter area is located at the northern edge of the site and contains the large majority of the cultural materials. Within this concentration occur approximately 25 flakes of Knife River flint and miscellaneous agate/chalcedony and 2 pieces of fire-cracked rock. The remainder of the site contains 3 flakes and a core. The entire site measures approximately 130 m northwest-southeast by 10 m northeast-southwest.

Although the site has a relatively low density and low number of cultural materials overall, the dense concentration of materials at its northern margin, especially considering the small amount of subsurface exposure, suggest that they may be derived from a shallowly, buried cultural level. This level could have the potential of yielding additional, significant information on the prehistory of the region, especially concerning lithic resource utilization. As a result, the site should be considered potentially eligible to the National Register of Historic Places. However, due to the lack of substantial or immediate impacts to this site, these recommendations could be given a low priority.

39C0107:

This is a complex of 9 stone circles and 10 rock cairns located on the edge of a bluff overlooking an ephemeral drainage valley which presently empties into Lake Oahe (see Figure 55). This drainage valley formerly

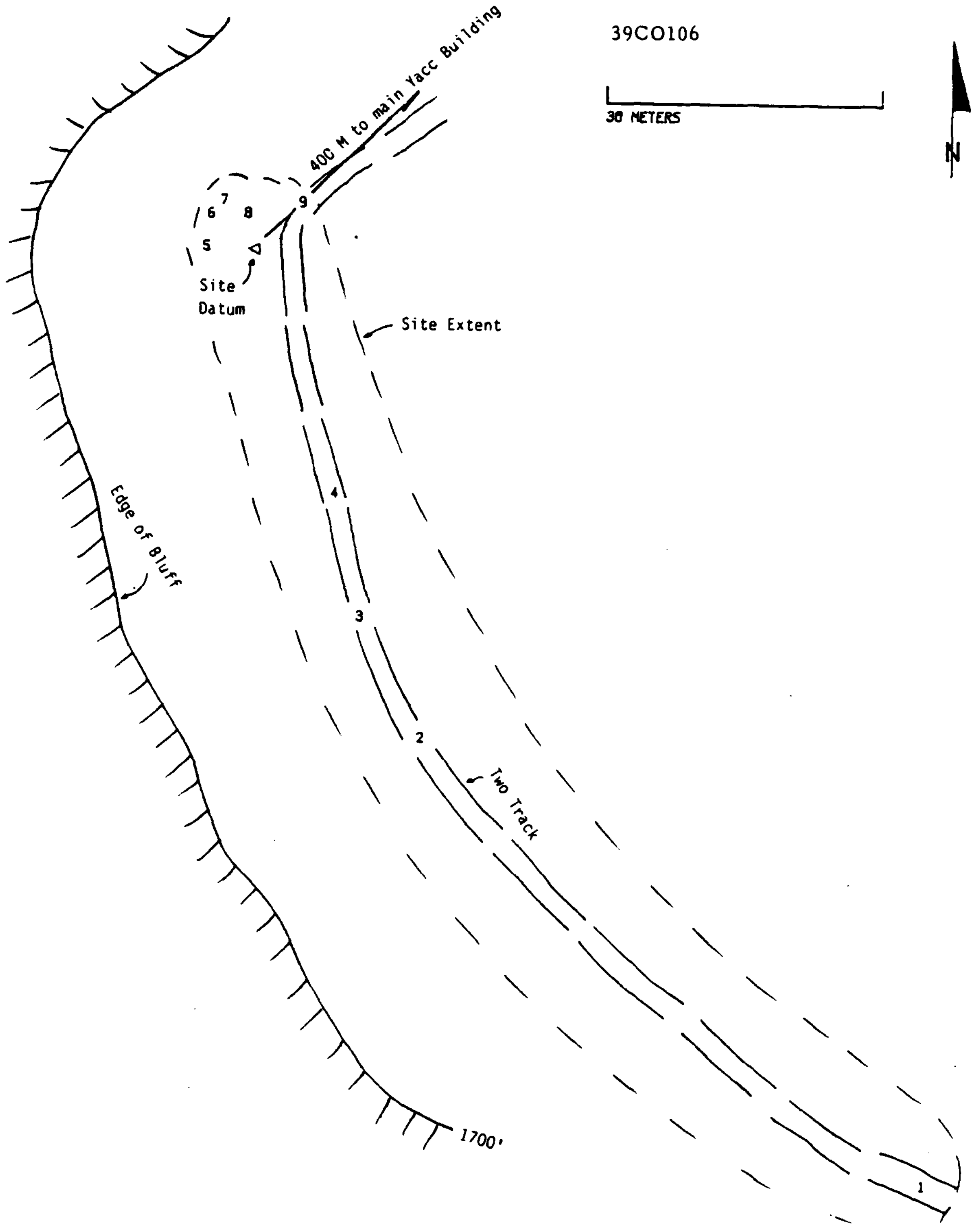

Figure 54. Map of 39CO106.

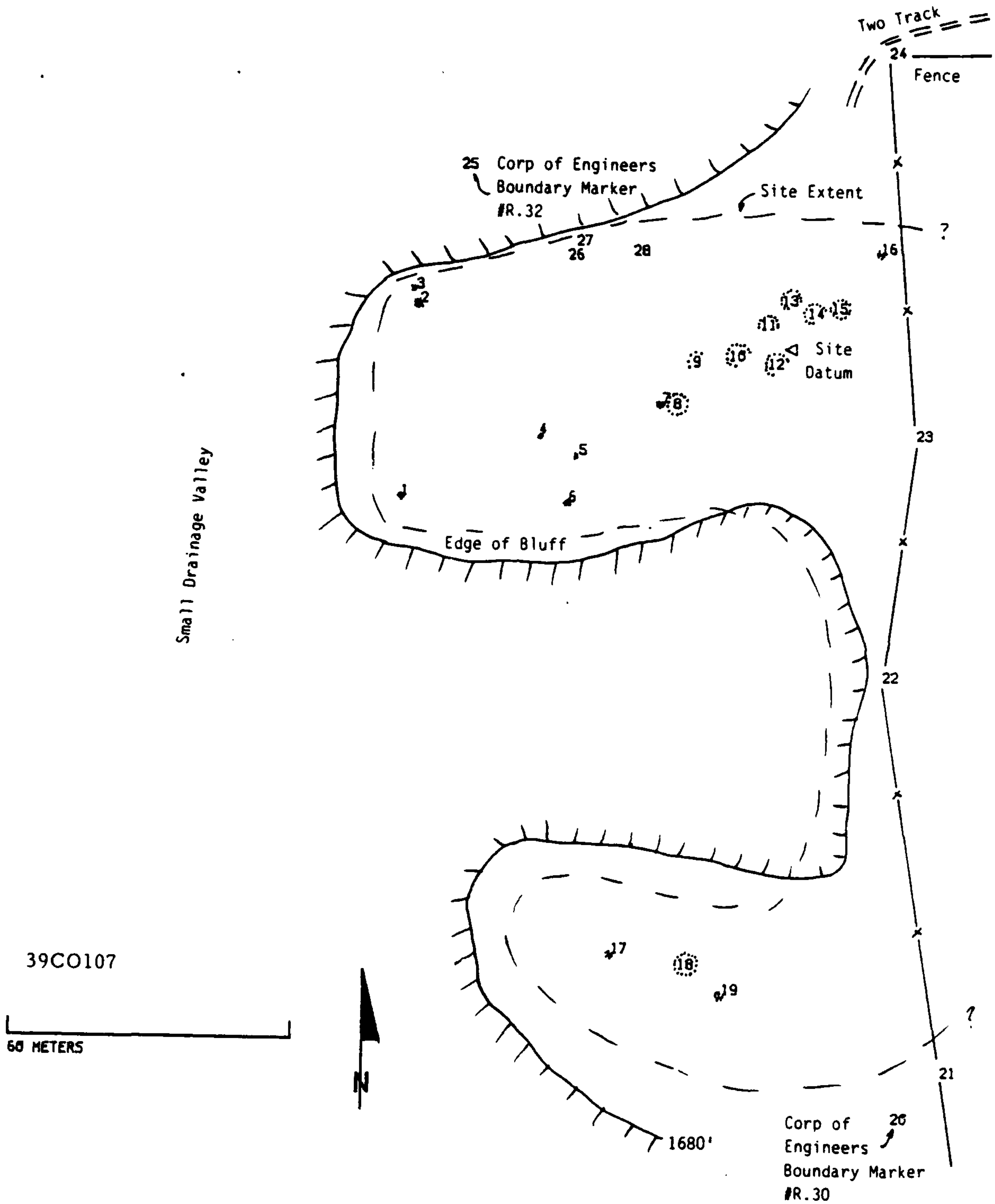

Figure 55. Map of 39CO107.

occurred along the south facing slope of the Oak Creek valley. Vegetation at the site is a mantle of prairie grasses with scattered shrubs occurring in the adjacent ephemeral drainage valley to the west. The condition of the site is good and all of the rocks of the cairns and circles are well-sodded in.

The stone features at this site occur on two, low east-west oriented ridges, separated by a shallow draw. Although the stone features generally appear to be confined to the central portion and western edge of the ridges, the site may have originally extended eastward into a cultivated field and into private land. Cultivation would have destroyed any stone features in this field.

The stone circles vary between 3.6 and 4.9 m in diameter with six features missing rocks on the south or southeast. Two of the circles also contain rocks in the center of the ring. The rock cairns are generally circular and range from one to two meters in diameter although one cairn is ovoid and measures approximately 2.2 by 3.6 m. In addition to the stone features, two basalt cores and 1 agate/chalcedony flake were also recorded.

Test excavations are recommended to determine if additional buried cultural materials are present in and around the stone circles, the function and relationship of the rock cairns to the stone circles and the site's cultural affiliation. These investigations are necessary to establish the site's significance in terms of its research potential. Therefore the site should be considered potentially eligible for nomination to the National Register of Historic Places. These recommendations can be assigned a low priority due to the lack of any foreseeable impact of the site.

39CO108:

This site consists of two small, low rock cairns located approximately 95 meters from one another. They are both situated on the crest of a narrow, gently southeast-sloping ridge which extends outward from a high bluff to the northwest (see Figure 56). The cairns are located on the lower end of the ridge near Lake Oahe and along a major bend in the former Missouri River. The rock cairns are well-sodded in and vary between 2-3 meters in diameter. Prairie grasses cover the site area with scattered trees and shrubs in the neighboring draws. Examination of the extensive beach exposure and cutbank profiles adjacent to the site failed to locate any additional cultural materials.

Test excavations are recommended to establish the function of these cairns and consequently the site's significance and research potential. The site should, therefore, be considered potentially eligible for nomination to the National Register of Historic Places. The condition of the site is good with little impact anticipated. Therefore these recommendations can be given a low priority.

39CO109:

This single rock cairn is located on another narrow ridge approximately 400 meters north of 39CO108. The cairn is situated in a small saddle along

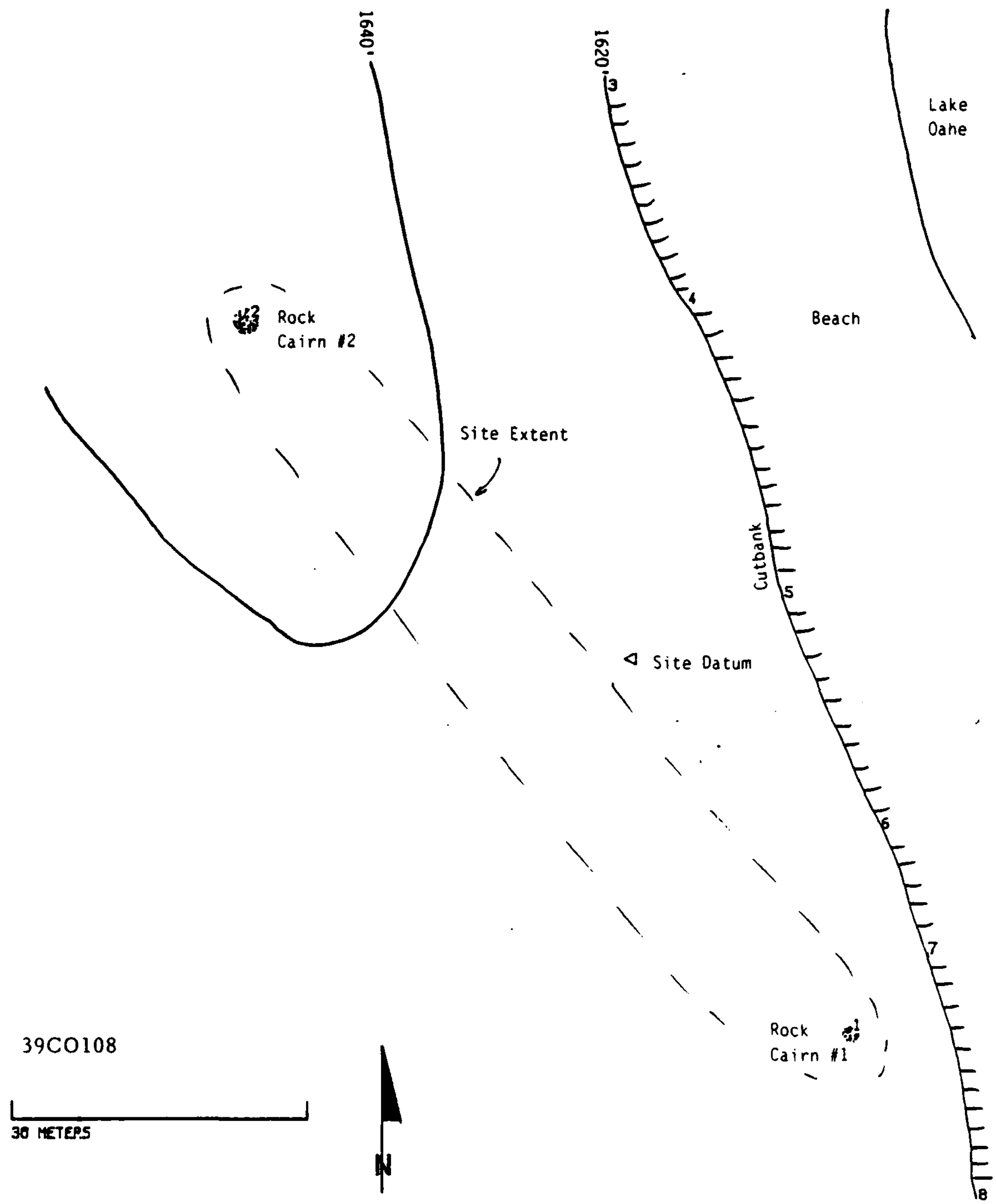

Figure 56. Map of 39CO108.

the crest of the east-west oriented ridge above Lake Oahe to the east (see Figure 57). The ridge contains outcrops of glaciofluvial gravels and cobbles which were the probable source of the low 5 meter diameter rock cairn. The rocks of the cairn are well-sodded in with prairie grasses while hardwoods and shrubs occur in neighboring draws.

As with other cairns, this site is also recommended for test excavation. Until the function and significance of these cairns are established they must be considered potentially eligible for nomination to the National Register of Historic Places.

39C0115:

This artifact scatter is located on the beach of Lake Oahe and formerly along the northern, lower slope of the Grand River valley (see Figure 58). The site occurs along the base of a ridge which extends southward from the high bluffs to the north. The ridge slopes are covered with prairie grasses with scattered shrubs along the numerous draws.

The site consists of 9 flakes, 3 biface fragments and one fire-cracked rock scattered over an area measuring approximately 10 meters north-south by 30 meters east-west. The majority of the cultural materials are made from locally available petrified wood suggesting that lithic reduction in the form of tool manufacture took place at the site. One flake was observed protruding from the cutbank at approximately ten centimeters below the surface, otherwise all other materials were found on the beach. From this, it seems evident that the materials on the beach originated from this shallowly buried level. However it also indicates that the buried materials are quite sparse and not very distinctive. It also seems likely that the majority of the site has been eroded since few cultural materials occurred near the cutbank. As a result, the site can be considered to have little integrity and is recommended as not eligible for nomination to the National Register of Historic Places.

39C0116:

This site consists of two foundations of local stone located on a terrace above the Grand River (see Figure 59). Part of the foundations and the site area are covered by prairie grasses while the river bottoms contain cottonwood forests. The larger foundation is rectangular in outline with an interior foundation and a one meter deep depression in the southeastern corner. The other foundation is located immediately to the west and is L-shaped.

The 1903 GLO Plat shows the presence of a YMCA at this location. In addition, the only ownership record derived from the chain of title search indicates that the land ownership was issued to the American Missionary Association on February 10, 1915, who held the land until its transfer to the U.S. Government on September 2, 1958 as a part of the Oahe Reservoir take area. The American Missionary Association and the YMCA were connected entities during this period (Dwight Call, personal communication AUgust 1985) and it is presumed that the YMCA facilities continued to exist after 1915.

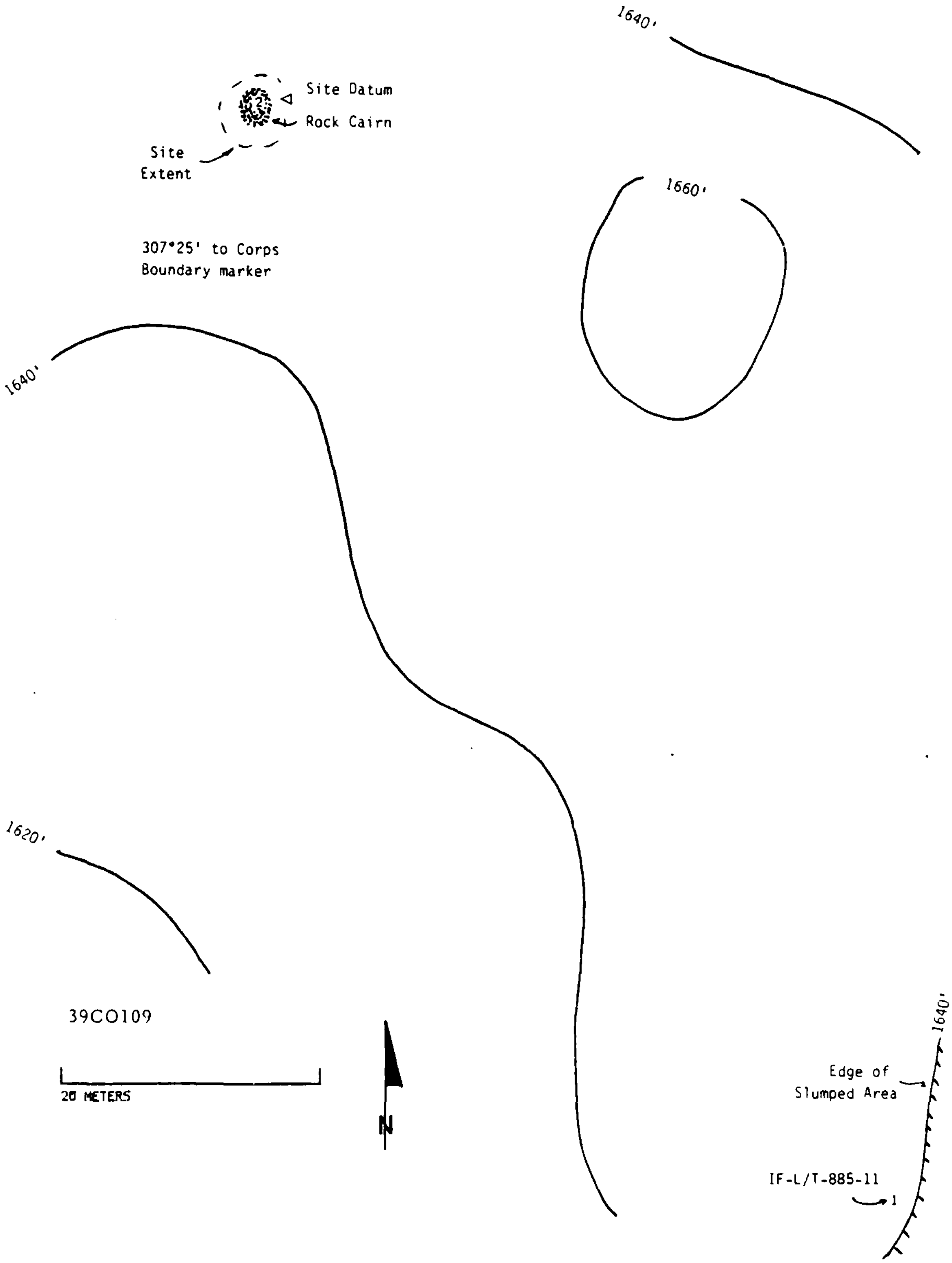

Figure 57. Map of 39C0109.

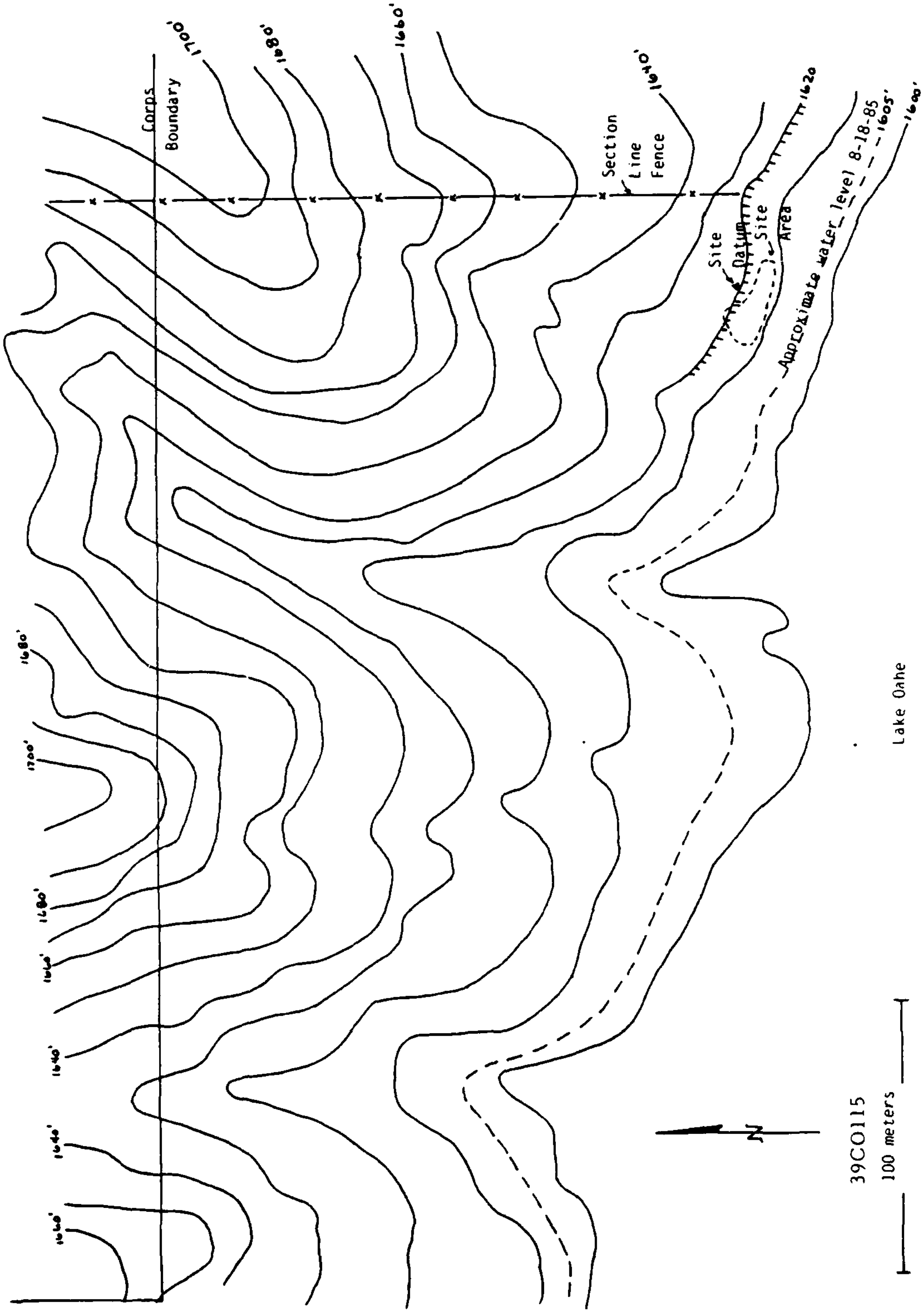

Figure 58. Map of 39CO115.

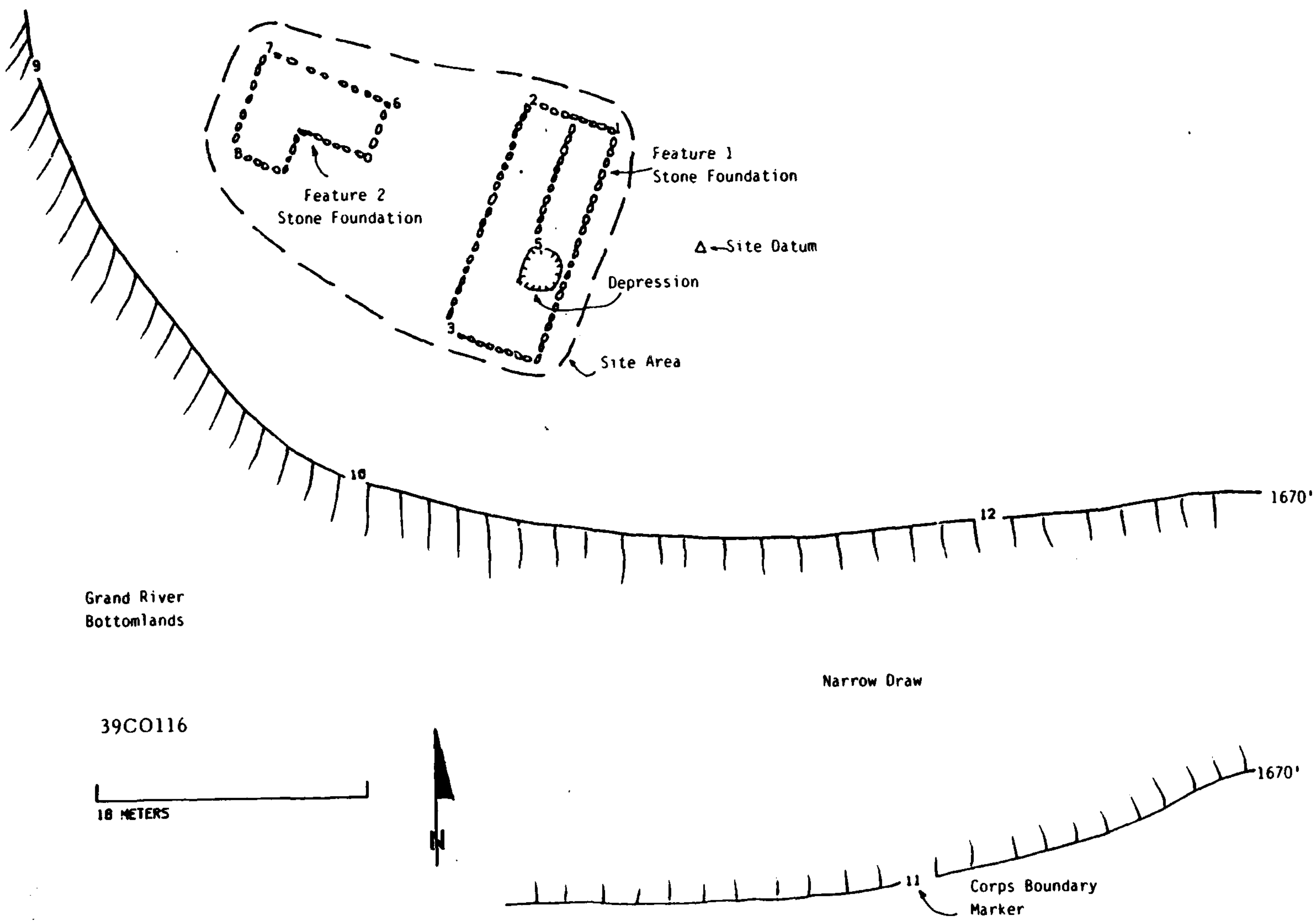

Figure 59. Map of 39CO116.

Dwight Call, Director of the General Convocation of Sioux YMCA's and the Office of the YMCA Archives at the University of Minnesota were contacted in order to obtain more information about this site. No written response was recieved from the archives regarding the query and Mr. Call had no personal knowledge of the 39CO116 location.

This site should be tested in order to determine if buried cultural deposits are present and their age and integrity. Cemeteries were established at some YMCA's (Tibbetts 1899:322). An effort should be made to determine if the cemeteries located outside of the Corps of Engineers boundaries, but in close proximity to this site are related to the YMCA occupation. Further archival research should also be conducted, perhaps at the YMCA archives at the University of Minnesota, and personnel at the Greater Sioux Convocation of YMCA's in Dupree, South Dakota should be contacted for other sources prior to making a determination of eligibility to the National Register of Historic Places.

It should be noted that the information obtained from the chain of title records was somewhat unclear concerning the date of land transfer. When no date of transfer was specified, then it was assumed that the land was transferred upon the death of the landholder.

39CO117:

The historic remains at this site consist of five depressions and associated debris situated on a low hill or terrace within the Grand River bottomlands (see Figure 60). The site is located on the edge of the prairie grassland to the south and a mixture of cottonwood and mesic forests to the north. The site consists of a dugout, a large depression, three smaller depressions, the remains of a well, a 1930s car body and a concentration of brick and wood posts. The bricks are not oriented in any one direction and therefore do not appear to be the remains of a structure.

This site corresponds to the location of a structure noted on the 1903 GLO Plat. The chain of title search indicates that this land was a part of Allotment No. 358, a Trust Patent to George Flyingby or George Homedeer issued on October 3, 1907. The land was transferred in the form of a Restricted Deed to Henry Ankle on December 17, 1941 and subsequently sold to the Standing Rock Sioux Tribe on July 10, 1950.

Flying By settlement was located 5 miles downstream from Running Antelope settlement, which is now called Little Eagle (Cudmore and Nelson 1984:29-30). This general location places it in the vicinity of this site. A Father Craft opened a Roman Catholic school, assisted by native teachers, at Flying By's camp circa 1886-1887 with 25 students in attendance (Milligan 1976:118). At some point, a Roman Catholic church was also constructed at Flying By's settlement (Cudmore and Nelson 1984:30).

The site should be considered potentially eligible for nomination to the National Register of Historic Places. Archival research and informant interviews should be conducted to determine if this is the location of Flying By's settlement. In addition, test excavations of the depressions and surrounding areas should be conducted to determine if buried cultural deposits relating to Flying By's settlement are present.

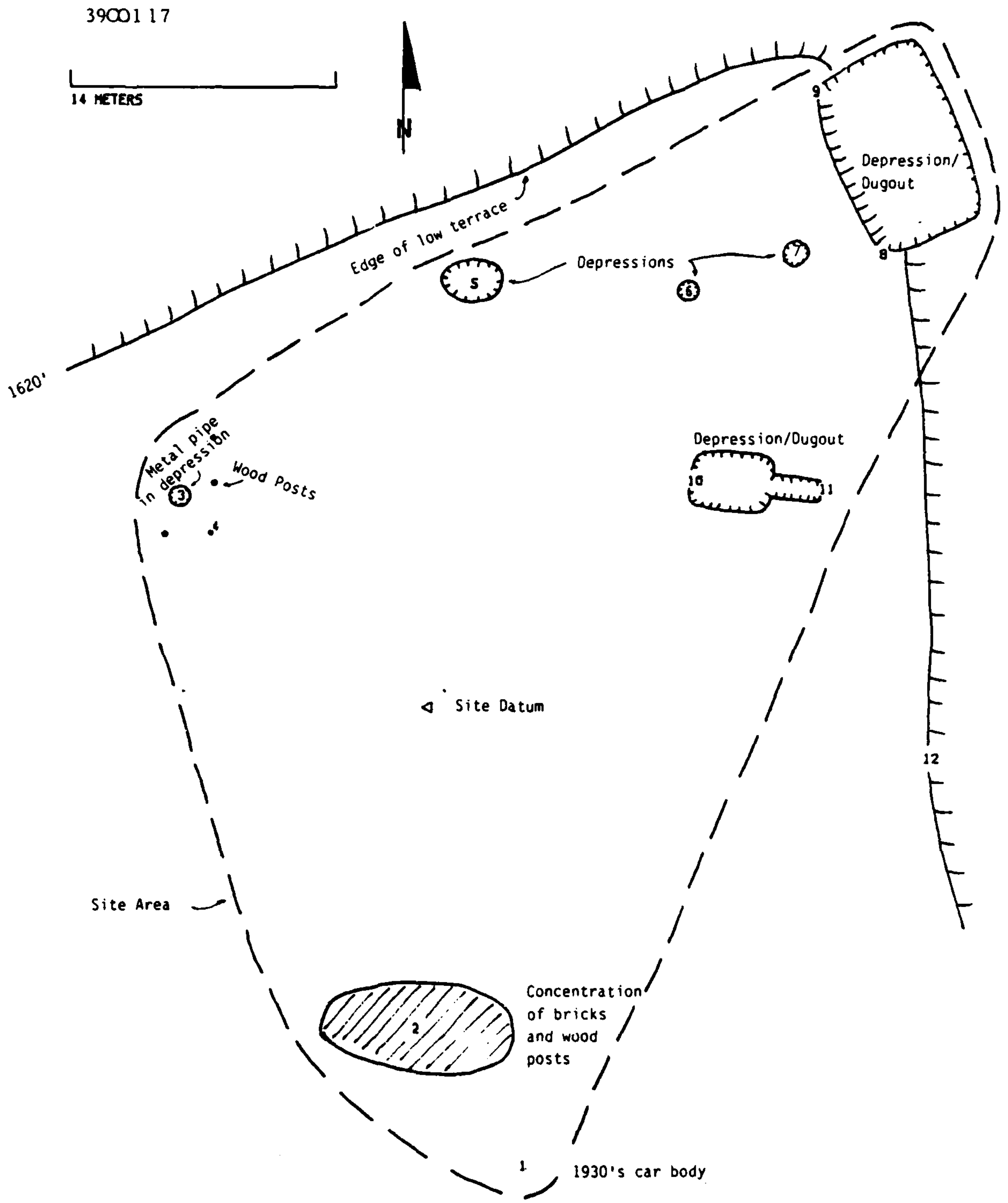

Figure 60. Map of 39C0117.

39C0118:

This site consists of a trash scatter on the lower slope of a hill at the mouth of a tributary valley of the Grand River (see Figure 61). The vegetation consists of prairie grasses, hardwoods and cottonwoods. Cultural material at the site includes brown and clear glass bottles and jars, lumber, galvanized and enameled wash tubs, an enameled coffee pot, a galvanized bucket, bed springs, a sleigh-like "stone boat" with metal runners used to haul rocks (hence the name) and a 1940s Ford car body. These materials may be associated with the historic depression noted as L/T 885-5 (see Appendix A, Map 11), located approximately 250 meters to the north and shown as an occupied structure on the 1956 U.S.G.S. topographic map.

Both of these locations were a part of Allotment No. 350, a Trust Patent issued to Thomas Whitehorse on October 3, 1907. Upon his death on March 7, 1942, ownership was transferred to Alexander Catch The Bear and Edna Whitehorse Phillips Red Bird. The land became a part of Oahe Reservoir take area in 1958.

The cultural materials at this site consist of an apparent trash dump with no discernable antiquity or distinguishing attributes. As a result, the site should be considered not eligible for nomination to the National Register of Historic Places.

39C0119:

The remains of this historic habitation is situated on a relatively flat bench that extends northward from the Grand River valley wall (see Figure 62). Prairie grasses presently cover the site while cottonwoods formerly occurred within the presently inundated river bottoms. The site is shown on the 1956 U.S.G.S. topographic map as consisting of two structures, one of which was occupied. The site presently consists of two stone foundations, three smaller depressions and various historic debris. The latter includes bone (probably bovid), assorted metal pieces, an old license plate, clear glass bottle fragments, white glass jar fragments, scattered building stones, a rubber innertube fragment, lumber, tar paper and various car body parts.

This location was known as Lot 11 in Allotment No. 259 which was a Trust Patent issued to Gus Rawhide on October 3, 1907. Upon his death on April 11, 1912, it was transferred to Mary E. Rawhide and then later transferred to Charles Whitesell on January 26, 1943. The U.S. Government became owner on September 2, 1958.

The integrity of this site appears to be good, despite the potential for continuing cutbank erosion. This site should be tested to determine if buried cultural deposits are present and the age and function of the depressions prior to making a formal determination of eligibility for nomination to the National Register of Historic Places.

39C0120:

This is the site of a historic habitation located at the end of a low ridge extending northward from the Grand River valley wall (see Figure 63).

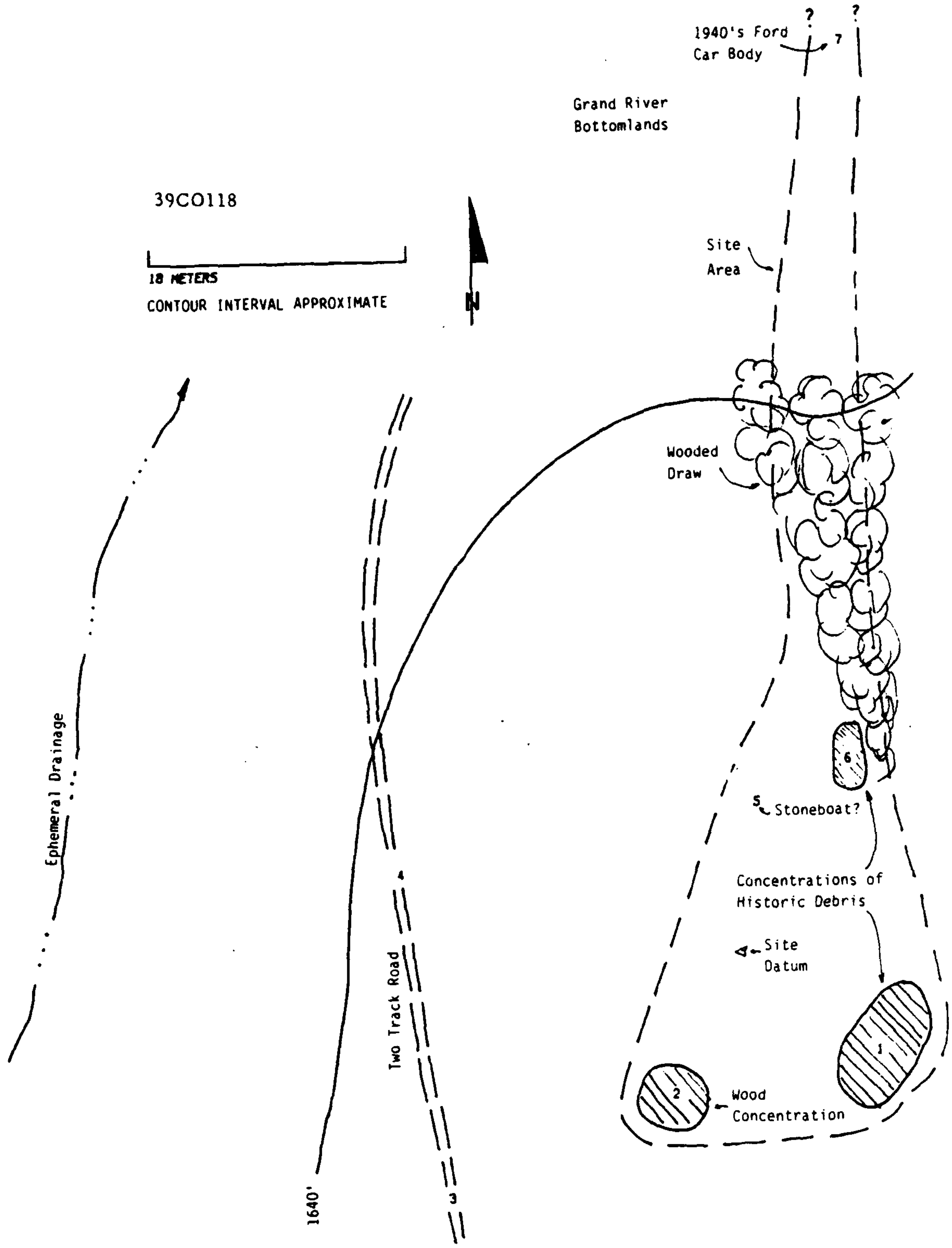

Figure 61. Map of 39CO118.

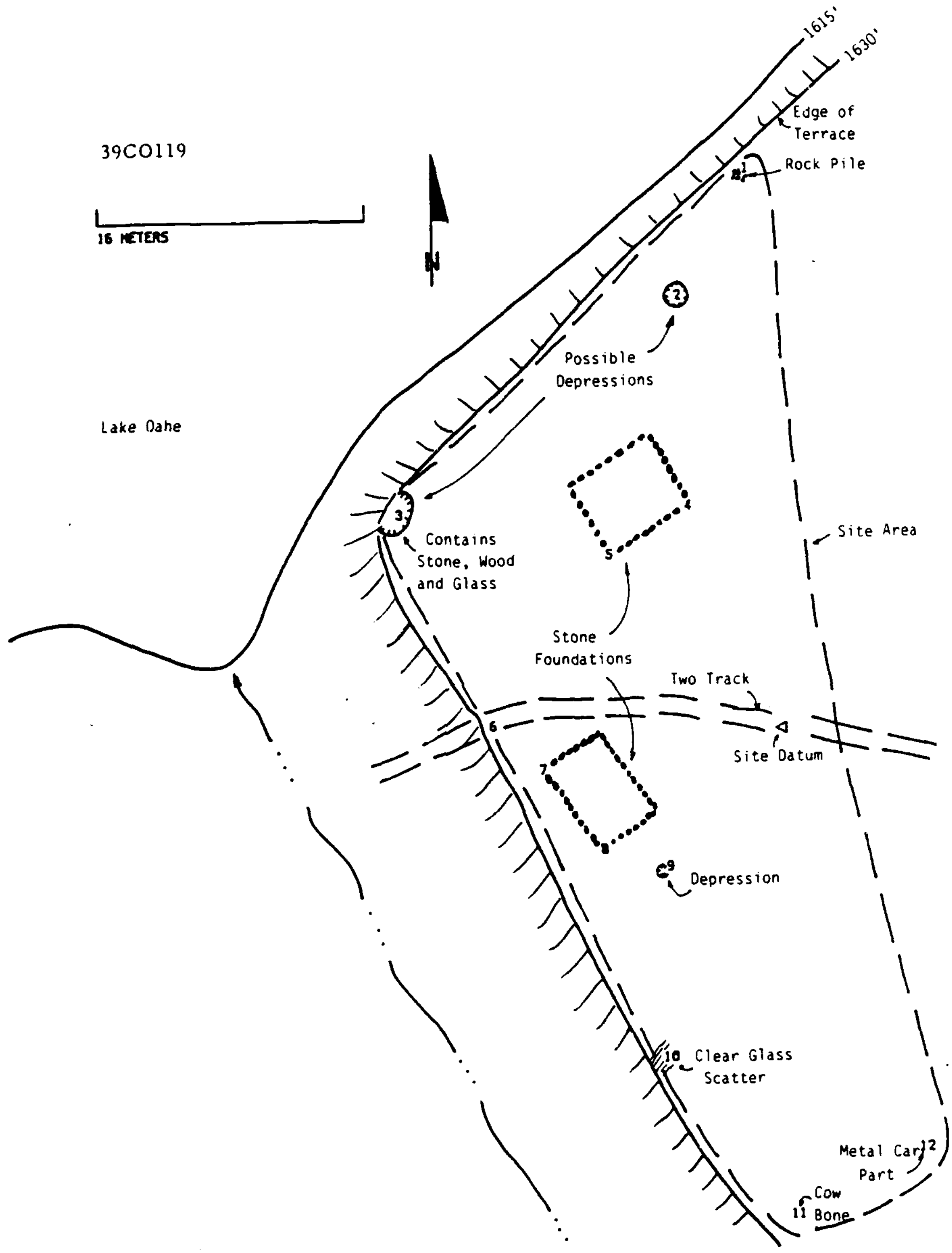

Figure 62. Map of 39CO119.

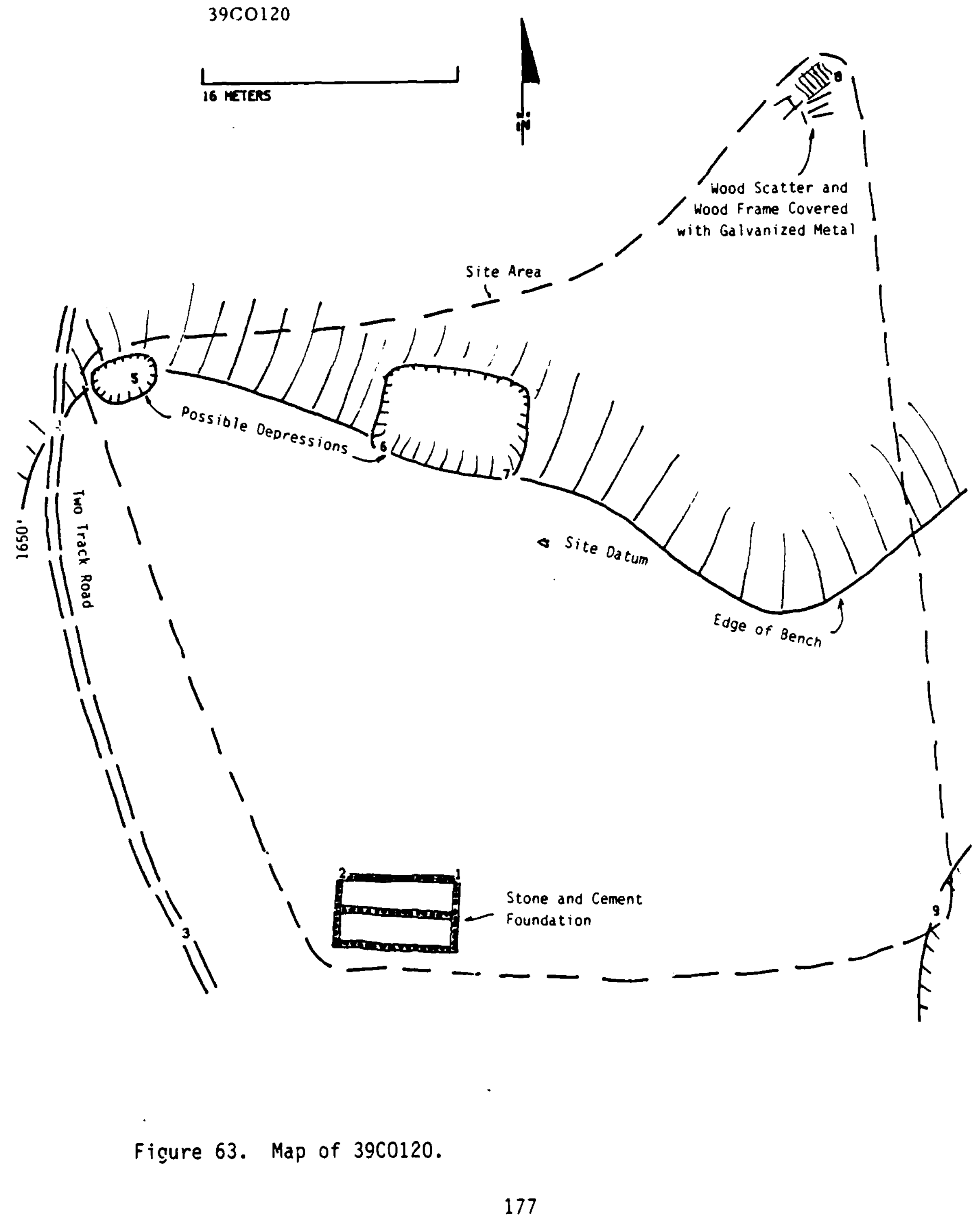

Figure 63. Map of 39CO120.

Vegetation consists primarily of prairie grasses while cottonwoods formerly occupied the river bottoms. The site consists of a rectangular stone and cement mortar foundation, two possible depressions cut into the end of the ridge and a light scatter of debris. The latter includes lumber, tar paper, clear glass bottle fragments, an aluminum cup, seam cans and a 1949 license plate.

The 1903 GLO Plat shows a structure at this location being occupied by Son Of Little Kill. The chain of title search indicates that this area was a part of Allotment No. ?51, a Trust Patent issued to Walter Birdhorse on October 3, 1907. In June 14, 1926, it was transferred to a Robert or Leon Birdhorse and then on March 9, 1938 to Elizabeth Dogman Birdhorse.

The occupation of this site appears to predate 1903. Test excavations should be conducted to determine the age and function of the depressions and the potential for buried cultural deposits within the foundation prior to a formal determination of eligibility for nomination to the National Register of Historic Places.

39C0121:

This site consists of four widely dispersed depressions situated on top of a bluff overlooking the former drainage valley of Oak Creek (see Figure 64). The bluff top is presently utilized as pasture, consisting primarily of prairie grasses. The depressions range in size from 3-6 meters in diameter. A few rocks were present in the bottom of one depression while another contained one rusted seam can. No structural remains were observed.

A structure is shown on top of this bluff top in the general vicinity of this site on the 1903 GLO Plat. The chain of title search shows that this location is a part of Allotment No. 59, a Trust Patent issued to Samuel Swift Cloud on October 3, 1907. However, this part of the allotment was shown to have been cancelled and apparently reverted back to the U.S. Government. No date is given for this cancellation. Testing to determine the age and function of the depression should be completed prior to a formal determination of eligibility for nomination to the National Register of Historic Places.

39C0122:

The 1903 GLO Plat shows a structure at this location occupied by Martin Swift Cloud. The site presently consists of a single depression on top of a bluff above the former Oak Creek drainage (see Figure 65). Most of the surface of the bluff had been cultivated at one time but is now dominated by native vegetation consisting of scattered prairie grasses. The depression is approximately three meters in diameter with no structural remains present. A small piece of unidentifiable historic ceramic plate was also found east of the depression. A possible road bed was also observed northeast of the site but cultivation has obliterated much of this feature or any other features which may have once been present.

The chain of title search indicates that this location was a part of Allotment No. 59, a Trust Patent issued to Samuel Swift Cloud on October 3, 1907. It was then transferred to Mrs. Samuel Caddote (Alma Swift Cloud

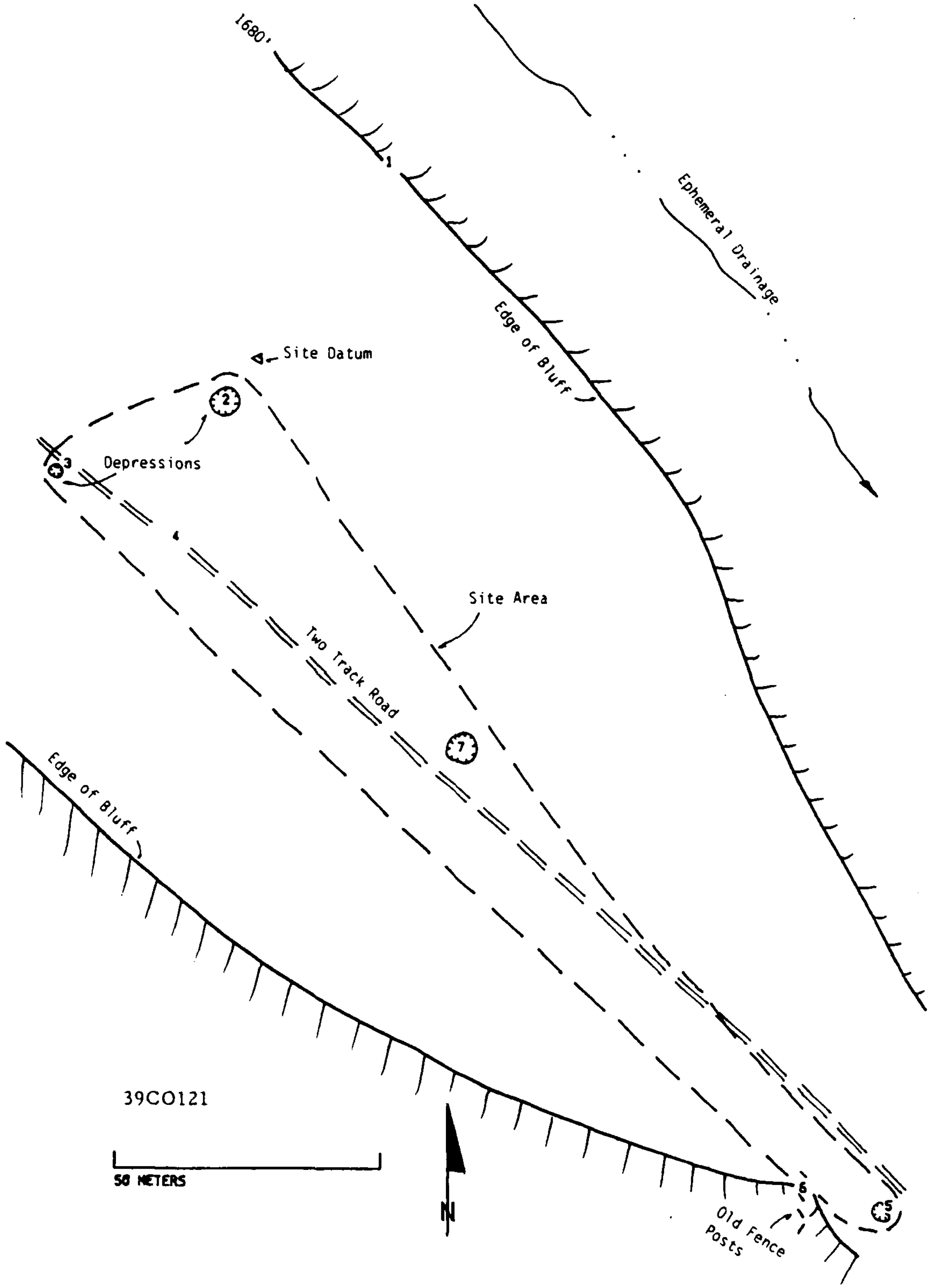

Figure 64. Map of 39CO121.

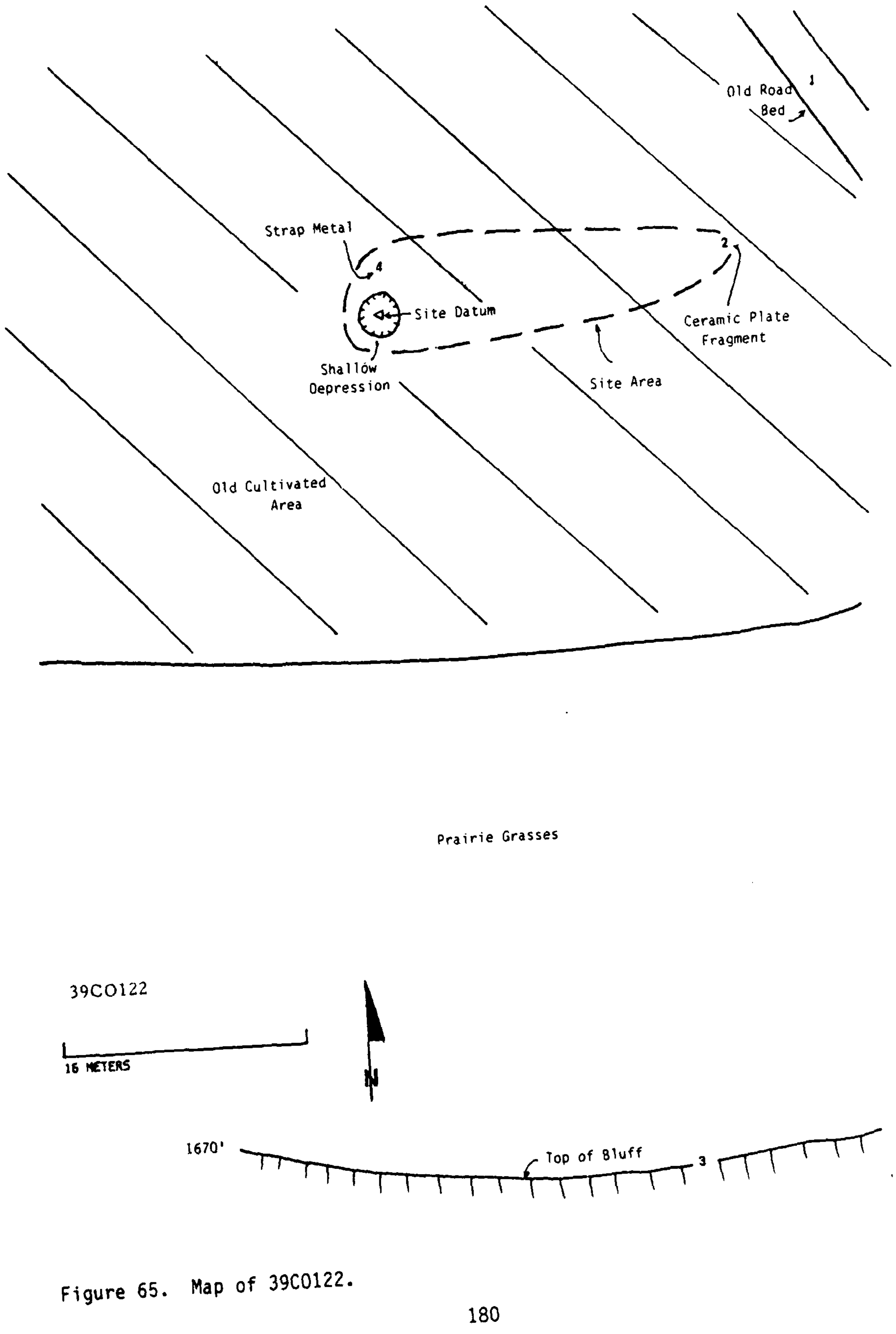

Figure 65. Map of 39CO122.

Caddote) on September 8, 1933, who owned it until its transfer to the U.S. government in 1958 for the Oahe Reservoir take area.

Minimally the integrity of this site appears to have been comprised by extensive cultivation. Based on its apparent lack of integrity and lack of other cultural materials, their is little information to be gained by additional work. Therefore, this site is not considered eligible for nomination to the National Register of Historic Places.

39CO123:

This site consists of five historic depressions situated on the top of a high bluff above the Grand River (see Figure 66). The area is covered with prairie grasses with various hardwoods occurring in the adjacent draws. Two of the depressions were cut into the edge of the bluff while the other three were excavated into the surface of the bluff. In addition to the depressions only a few large rocks were observed at the site, one of which occurred in the bottom of one depression. This site could be associated with a gravel quarry located on private land west of the site. The quarry has been abandoned for some time, as sparse vegetation is present within the quarry pits.

The chain of title search shows that this location was a part of Allotment No. 228, a Trust Patent issued to Highbull (Gilden or Gideon Highbull) on October 3, 1907. Upon his death, it was transferred to Mrs. High Bull (or Her Cane) on May 18, 1922. She divided the land on January 9, 1926 between 43 heirs which was subsequently subdivided again. The land was finally consolidated when taken over by the U. S. Government for Oahe Reservoir in 1958.

Due to the shallowness of the soil and lack of additional cultural materials, and low potential for additional buried cultural materials, the site is not considered eligible for nomination to the National Register of Historic Places.

39CO124:

The cultural remains at this site consist of an abandoned corral situated on top of a narrow bluff overlooking the Grand River (see Figure 67). The surface of the bluff is covered with a mixture of cheatgrass and native prairie grasses. Some hardwoods occur in the draws along the slopes of the bluff. The site consists of the remains of a corral which includes a few fence posts scattered around an area of disturbed vegetation, barbed wire and a few rusted seam cans. None of the posts are standing upright. The area has also been disturbed by prairie dogs but no cultural materials were observed next to their burrows.

This area is listed as Lot 4 of Allotment 103 which was issued as a Trust Patent on October 3, 1907 to Ignatius End Of Cloud. This was later transferred in the form of a restricted deed to Mrs. Herbert Buffalo Boy on May 16, 1925 and then to Regina La Fromboise on February 7, 1935. The U. S. Government obtained ownership in 1958 for Oahe Reservoir.

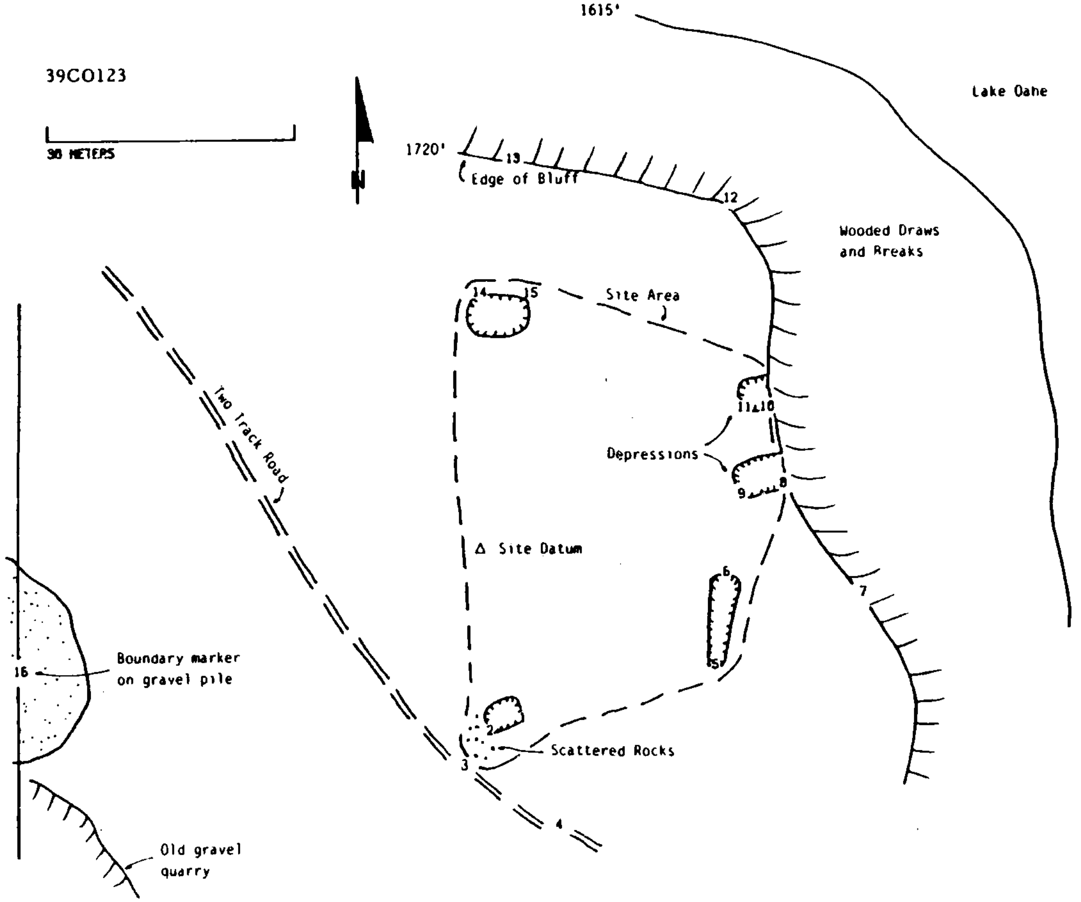

Figure 66. Map of 39CO123.

39CO124

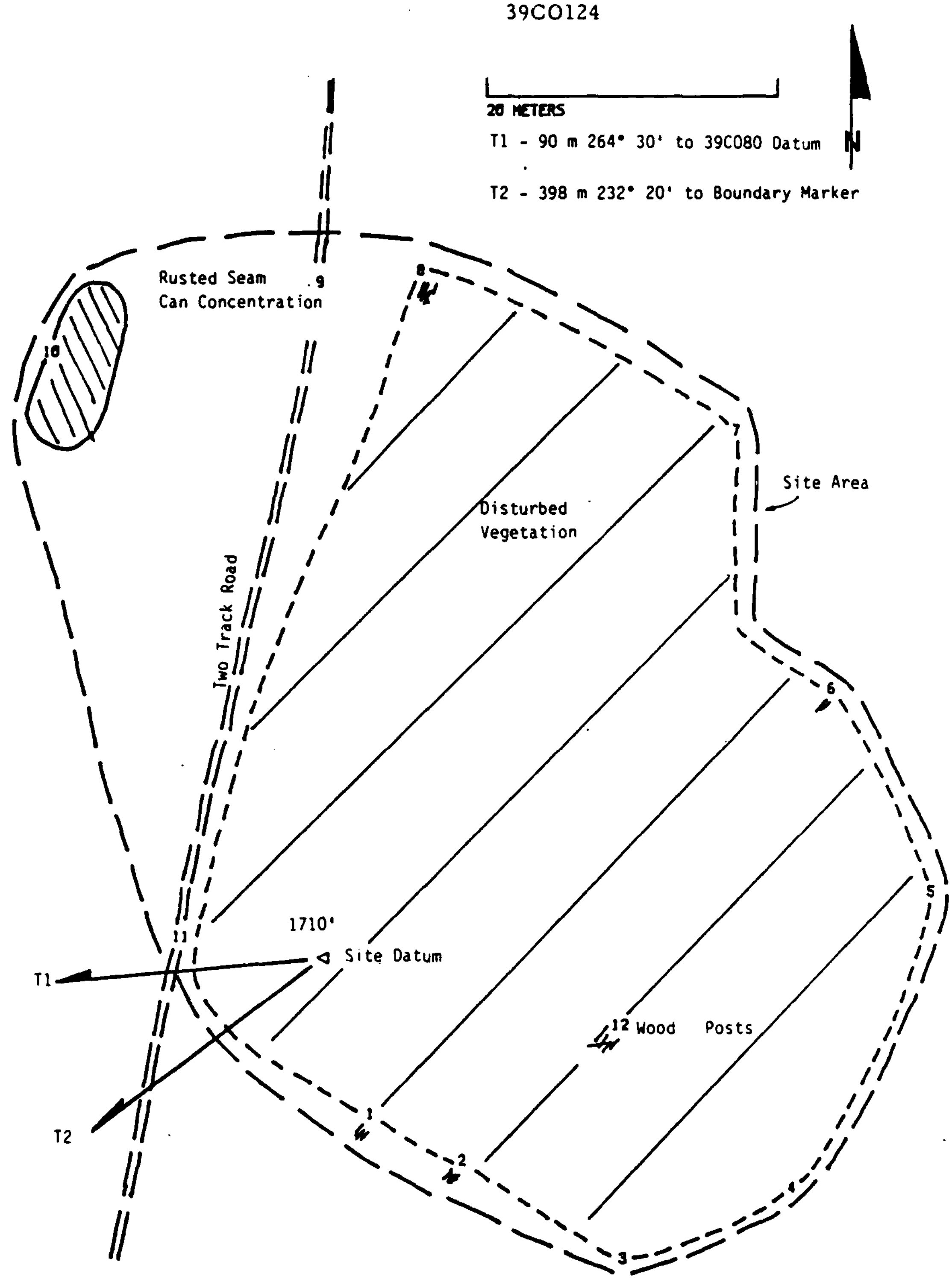

Figure 67. Map of 39CO124.

No further information is likely to be obtained from this site. It is not believed to be eligible for nomination to the National Register of Historic Places.

39CO125:

This site consists of the remains of a historic habitation located on a high bluff above the Grand River (see Figure 68). A mixture of native prairie grasses and cheatgrass covers the site area. The site consists of three large depressions and a trash dump. The latter occurs on the slope of the bluff and includes primarily bricks, wood posts, logs, lumber, large and small rusted seam cans, cone-top cans, clear glass bottles and jars and wire. Most of the bricks and wood occurred on the southern end of the dump adjacent to one of the depressions. These materials may be the structural remains of this depression.

The chain of title search shows this location as being a part of Allotment No. 68, a Trust Patent issued on October 3, 1907 to William Shell. It was later transferred to Mrs. William Shell on November 28, 1933 and then to the Standing Rock Sioux Tribe on May 27, 1939. It became a part of the Oahe Reservoir take area in 1958.

Integrity at this site appears to be good. Test excavations should be completed in order to determine if buried cultural deposits are present within the depressions and their age and function prior to a formal determination of eligibility for nomination to the National Register of Historic Places.

39CO126:

This is the location of a historic habitation adjacent to a small ephemeral tributary of Oak Creek (see Figure 69). Scattered oak trees occur along this tributary with a mixture of native prairie grasses and introduced plants covering the general site area. The site consists of two cement foundations, two possible depressions and associated debris. The latter includes a hub cap, a 1920s car hood, rusted and galvanized metal, lumber, an enameled metal wash basin and a ceramic plate fragment. The 1956 U. S. G. S. topographic map shows three structures at this location, one of which was occupied.

Information derived from the chain of title search indicates that this location was a part of Allotment No. 15 which was issued as a Trust Patent to Felix Disputed on October 3, 1907 and then sold to A. B. Jackson on January 7, 1909. The U. S. Government acquired the land for Oahe Reservoir in 1958. The chain of title information at Fort Yates indicated that A. B. Jackson was white and does not appear to have been important in history of the area. However, this site could provide information in which to compare the adaptations and material culture of Euroamerican and Native American habitations during the early twentieth century. Test excavations are recommended to determine if sufficient information is present to address these questions. As a result, the site should be considered potentially eligible for nomination to the National Register of Historic Places.

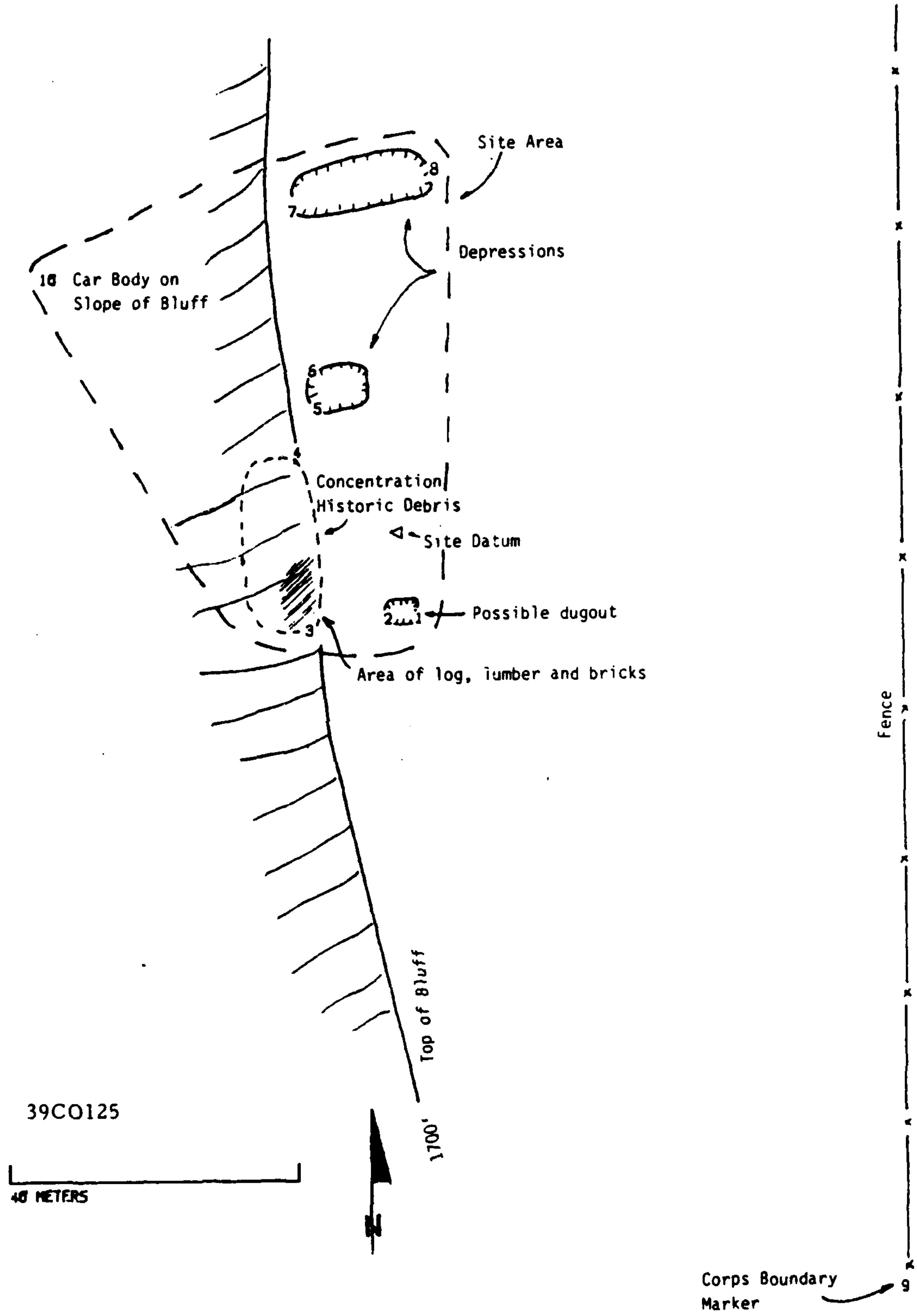

Figure 68. Map of 39CO125.

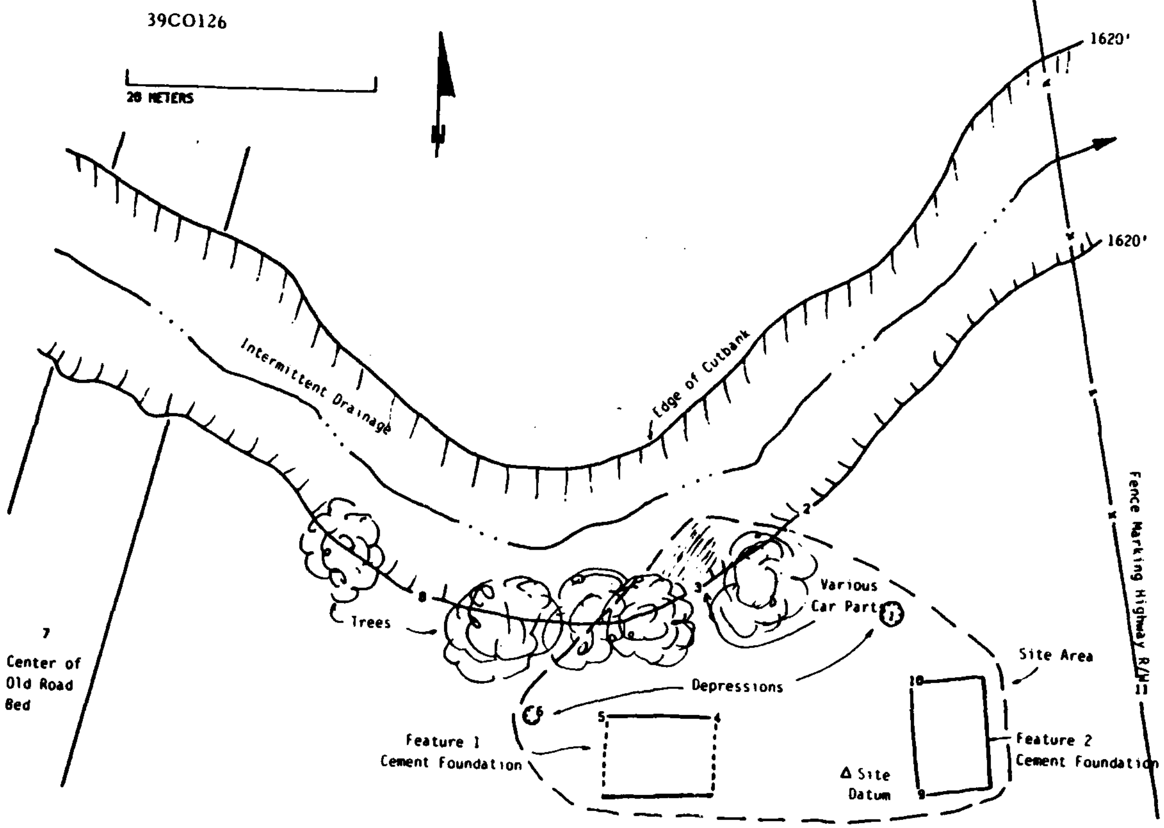

Figure 69. Map of 39CO126.

39CO127:

This site consists of a few widely scattered depressions located on top of a bluff above Oak Creek (see Figure 70). Vegetation cover is dominated by a mixture of prairie grasses and cheatgrass. The seven depressions at the site vary widely in size and depth. One of the shallow depressions contains a number of large sandstone rocks which are believed to be the remains of a foundation. Adjacent to another depression is a concentration of coal, a blue-green glass bottle bottom and a sickle bar guard for a swather or combine. Other materials on the site include two galvanized metal buckets and a galvanized piece of sheet metal.

The chain of title search shows this location to be a part of Allotment No. 97 which was issued to Joseph Bluecloud on October 3, 1907. Upon his death on September 25, 1912, it was transferred to Mrs. Joseph Bluecloud. On November 24, 1917, it was subdivided between 17 heirs and further subdivided later. It was reconsolidated when acquired by the U. S. Government for Oahe Reservoir in 1958.

Based on the number and size of the depressions and the material culture remains, this site is presumed to be a habitation site. However the functions and ages of the depressions as well as their potential to contain buried cultural deposits must be determined. As a result, test excavations are recommended prior to making a formal determination of eligibility for nomination to the National Register of Historic Places.

39CO128:

This historic site consists of eight depressions and a sparse scatter of historic debris. The site is situated on the upper slopes and top of a small knoll north of Baldhead Creek (see Figure 71). Prairie grasses cover the site area with cottonwoods, oaks and other shrubs and grasses occurring along the creek bottoms.

Six of the depressions are located on top of the knoll with the other two along the upper slopes. The depressions vary widely in size and depth. The historic debris is located down the slope from the latter depressions and consists of rusted seam cans, various metal pieces, ceramics and wood. These materials are of modern manufacture and do not appear to be older than the 1920s. In addition to these materials, a few rocks, bones (probably bovid) and one brick occurred in two of the depressions.

The chain of title search indicates that this area was a part of Allottment No 842 issued as a Trust Patent to Her Nation (Mrs. Little Horse). Upon her death on February 14, 1929 it was transferred to William Hand. He died on December 19, 1935 and the land was divided between Fern Hand Mrs. William (Alice) Hand. The former later divided his portion to David and Annette Marie Long Chase. It was reconsolidated when acquired by the U.S. Government in 1958.

Test excavations are recommended in order to determine the age and function of the depressions. The presence of bone in one of the depressions may also provide subsistence information which could be used to examine changes in subsistence practices through time with comparisons to other Historical/Protohistoric Sioux sites. Therefore the site should be

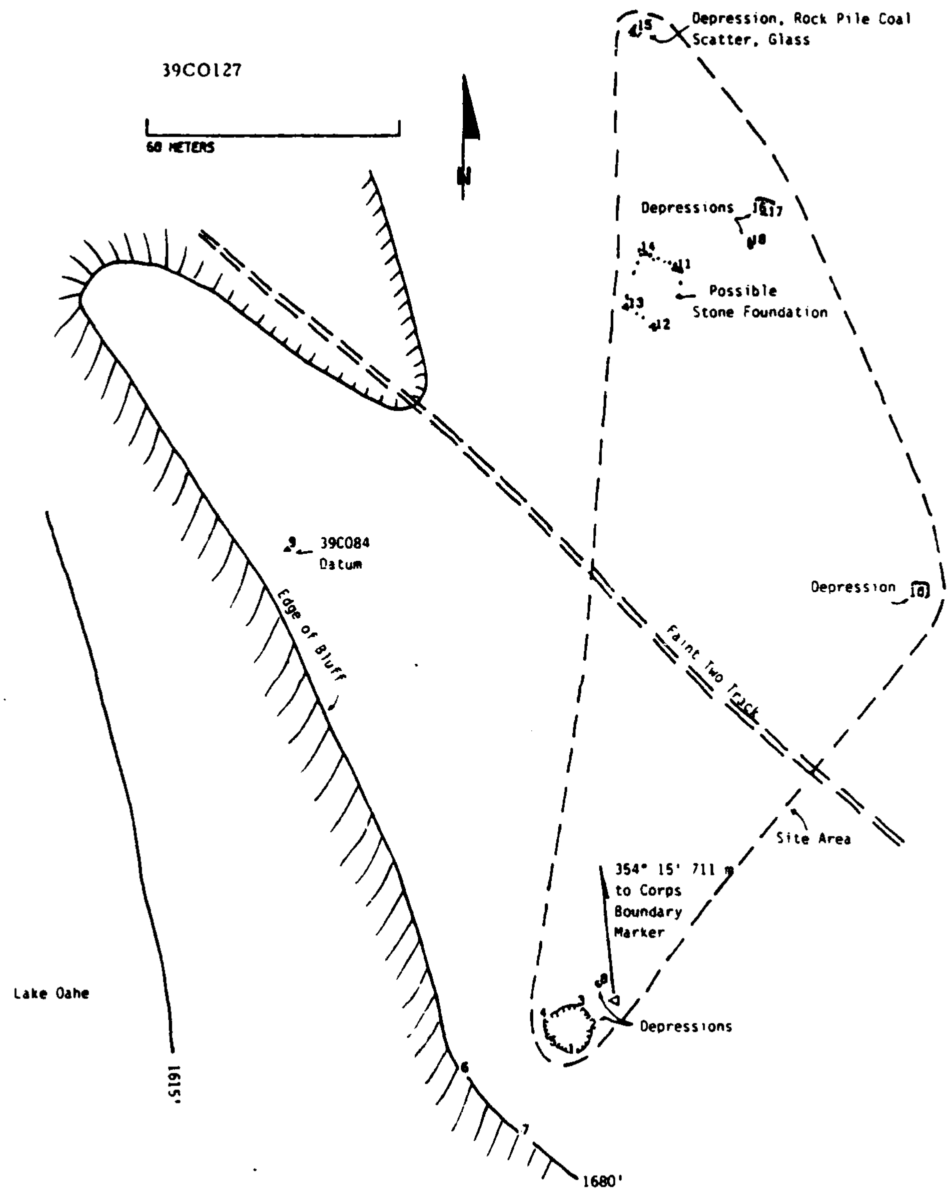

Figure 70. Map of 39C0127.

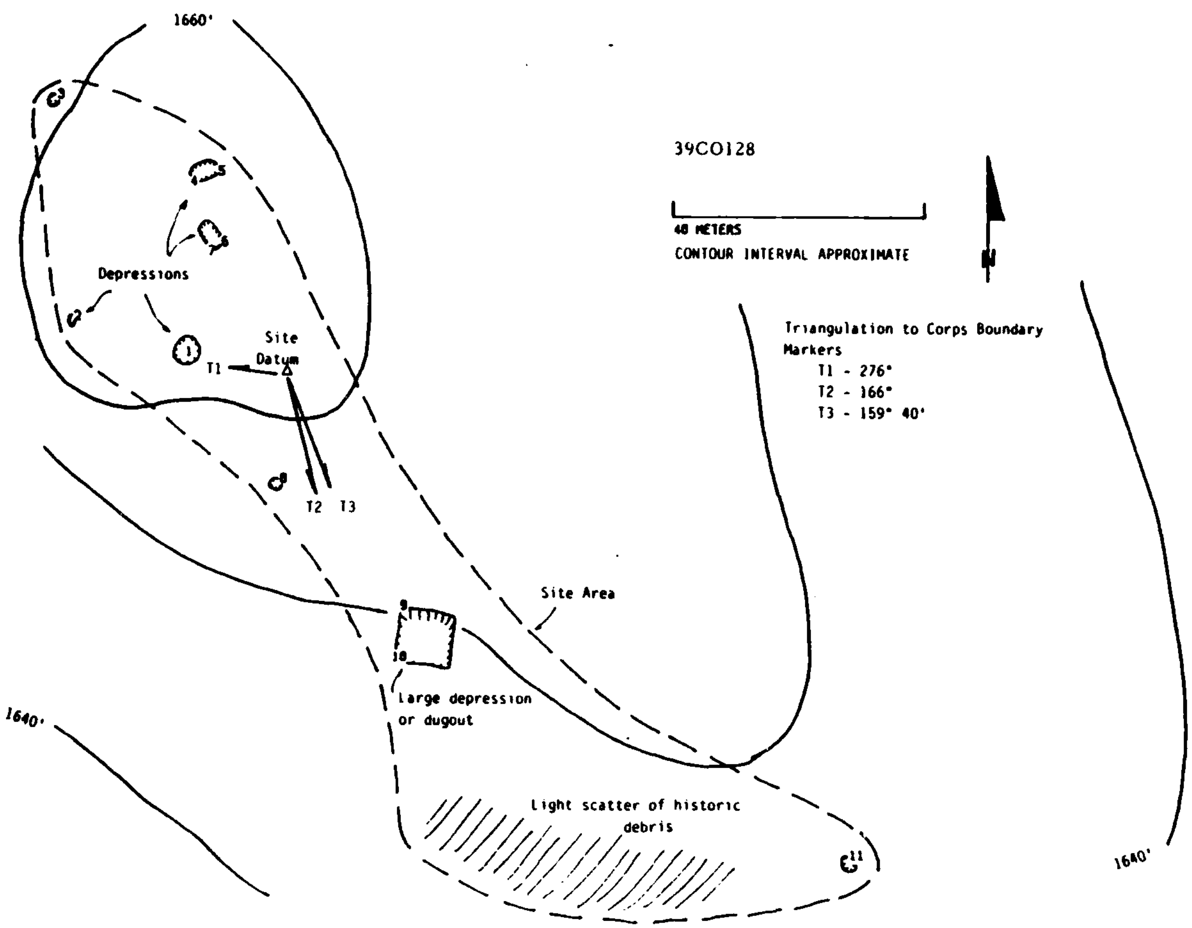

Figure 71. Map of 39CO128.

considered potentially eligible for nomination to the National Register of Historic Places pending testing.

39CO129:

This site is apparently the remains of a farmstead located on a relatively flat terrace near the confluence of Baldhead Creek and Lake Oahe (see Figure 72). Vegetation is a mixture of weeds occurring within the zone of inundation by Lake Oahe and prairie grasses. A shelter belt of various deciduous trees form the western and northern boundaries of the site. This is the only historic site within the project area with a shelter belt.

The site consists of a cement foundation and next to it, a small deep depression, and a small trash pile. The latter includes brown and clear glass bottles and jars (modern manufacture), rusted seam cans and the apparent remains of a small chicken coop made of galvanized metal and chicken wire. No materials were found within the structure or depression.

This farmstead is shown as an abandoned (i.e., empty) structure on the 1966 U.S.G.S. Mahto NE topographic quadrangle but is not present on the 1947 Corps of Engineers, War Department maps (Sheet 119). The chain of title search is the same as described for 39CO128.

Integrity at this site appears to be good. Very little disturbance appears to have taken place since the site was abandoned and the structure(s) removed. Test excavations should take place to determine if additional buried cultural deposits are present which could yield information on reservation period settlement and subsistence activities. As a result, this site is considered potentially eligible for nomination to the National Register of Historic Places.

39CO130:

The three depressions and associated debris comprising this site are located on the lower slope of a hill near the former confluence of Oak Creek and the Missouri River (see Figure 73). The site is covered with a mixture of prairie grasses and alfalfa. A few oak trees occur at the head of a small draw to the north of the site. Two of the depressions are small and shallow with no other cultural materials present. The other depression is large and steep-walled and contains log and lumber structural remains. An entrance occurs on the west side of the square depression.

A structure is shown at this location on the 1903 GLO Plat. This particular piece of land was a part of Allotment No. 156, a Trust Patent to John Lamont issued on October 3, 1907. It then went to Cecilia Lamont upon his death on December 23, 1920. She divided the land to Edward and Emma Lamont on January 1, 1930. Emma Lamont subdivided her portion between seven heirs on December 26, 1933 while Edward divided his portion between four heirs on June 17, 1940.

Based on the information from the GLO plat, this site appears to predate 1903. Test excavations should be completed in order to determine if the depressions are related to the pre-1903 occupation and whether they contain intact buried cultural deposits which could yield information on

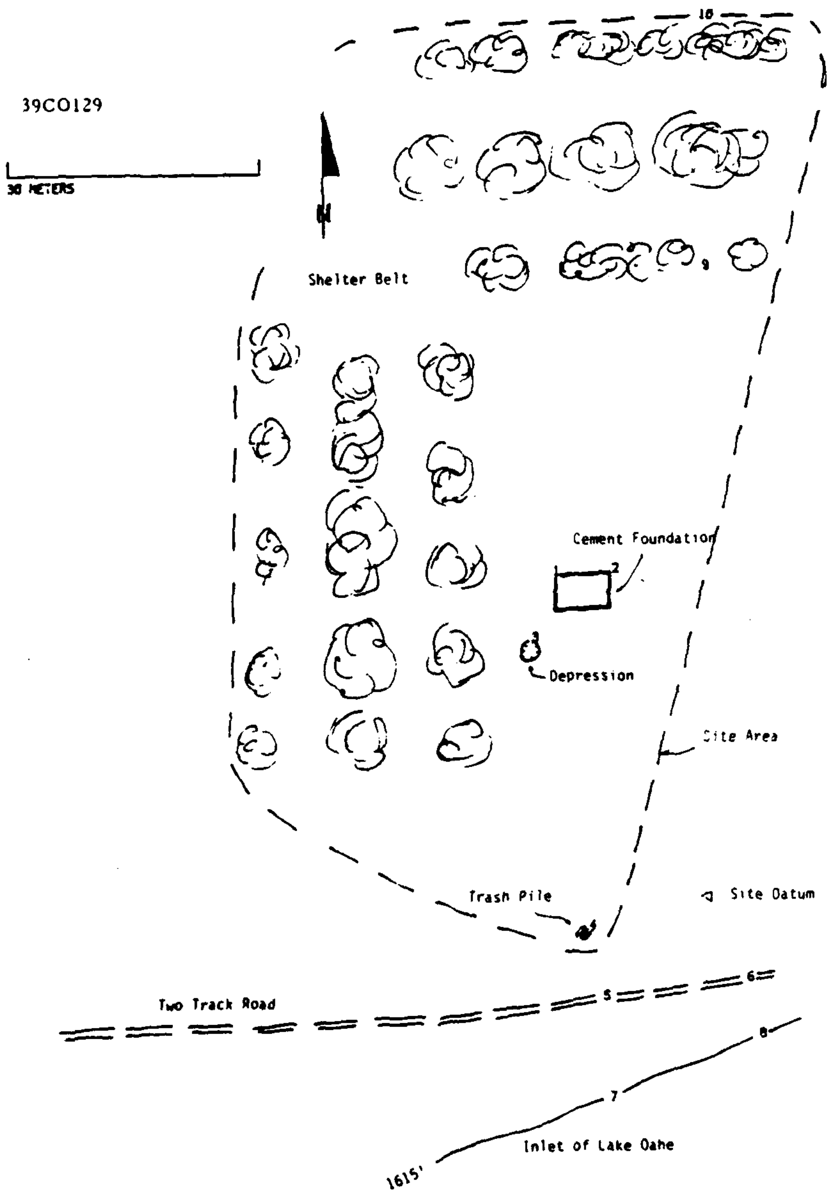

Figure 72. Map of 39CO129.

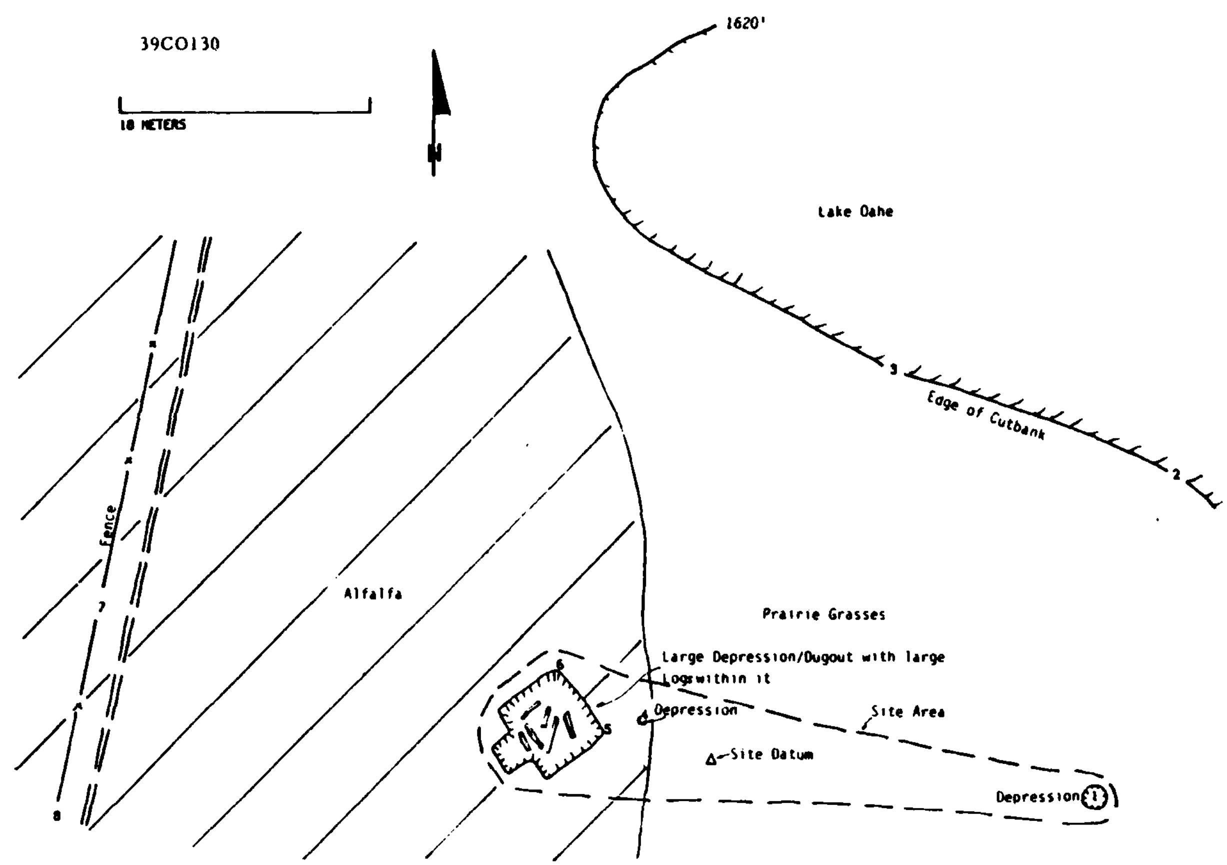

Figure 73. Map of 39CO130.

the early reservation period. As a result this site should be considered potentially eligible for nomination to the National Register of Historic Places.

39CO131:

The remains at this site appear to represent a portion of the cemetery associated with the Mad Bear Mission. The cemetery at the mission is shown on the 1947 Corps of Engineers topographic maps as occurring on a narrow ridge extending eastward from a large hill (see Figure 74). No trace of the mission was noted; it may have been inundated. This site presently consists of numerous oval depressions approximately 1 x 2 meters in size and oriented north-south and a 2 x 3 meter rock concentration. The latter contained one wood and two metal posts sticking upright out of the ground and an apparent cement marker. Part of the inscription reads "1915 NOV" however the remaining words on the marker are not legible and do not appear to be English. The letters on the marker were made by pressing glass beads into the cement. The site is rapidly eroding into Lake Oahe; however it is not known if the depressions contain human remains. It is possible that the remains could have been moved to higher ground when Lake Oahe was filled.

The chain of title search shows that this location was issued as Patent Record No. 1 to the Bureau of Catholic Missions on February 16, 1911. The U. S. Government obtained ownership for Oahe Reservoir in 1958.

Because of the relatively early age of the settlement and mission, this site may have the potential to provide significant information relative to early and perhaps pre-reservation history. Further archival and informant information should be obtained prior to making a determination of eligibility for nomination to the National Register of Historic Places.

39CO132:

The cultural materials at this site consist of a pile of bricks, lumber and barbed wire. The site is located along a small hardwood draw on the eastern slope of a large glacial ridge (see Figure 75). The site is approximately 25 meters north of the draw on a south-facing slope. The slope is covered with prairie grasses and various shrubs.

The site is composed of a pile of 10 logs or fence posts adjacent to a parallel arrangement of nailed boards. The nails are round and this wood feature is suggestive of a wall or roof which has been transported to the site. Although other structural materials are present, including a stacked pile of bricks, these materials are believed to represent a storage area due to their orderly arrangement rather than a collapsed structure.

The 1903 GLO Plat shows a structure approximately 200 meters to the north of this site which may be associated. The lack of deterioration of the wood and bricks would, however, indicate a more recent age for the present site.

The chain of title indicates that this land was issued as a Trust Patent allotment to Joshua Low Dog which was transferred to his daughter,

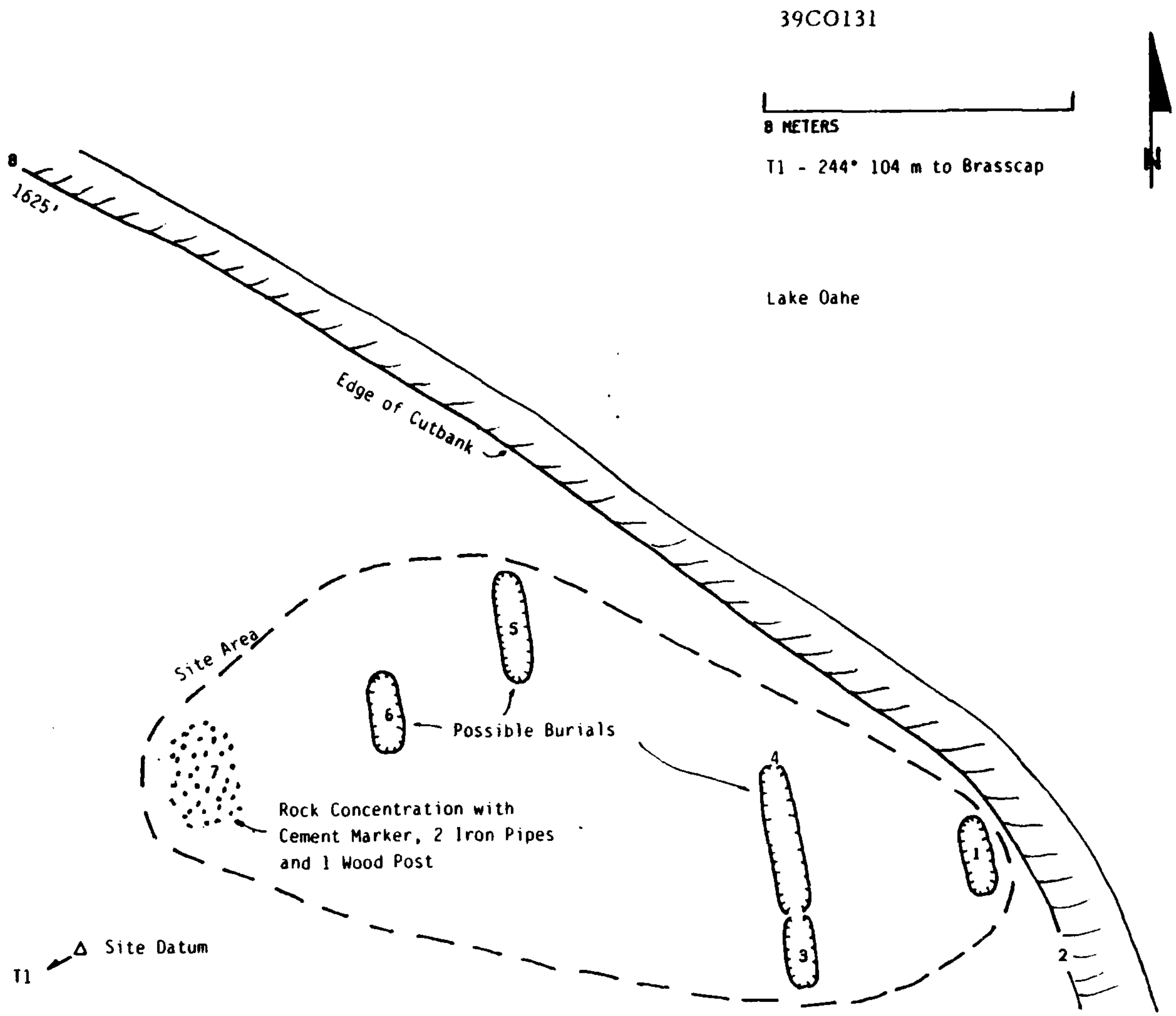

Figure 74. Map of 39CO131.

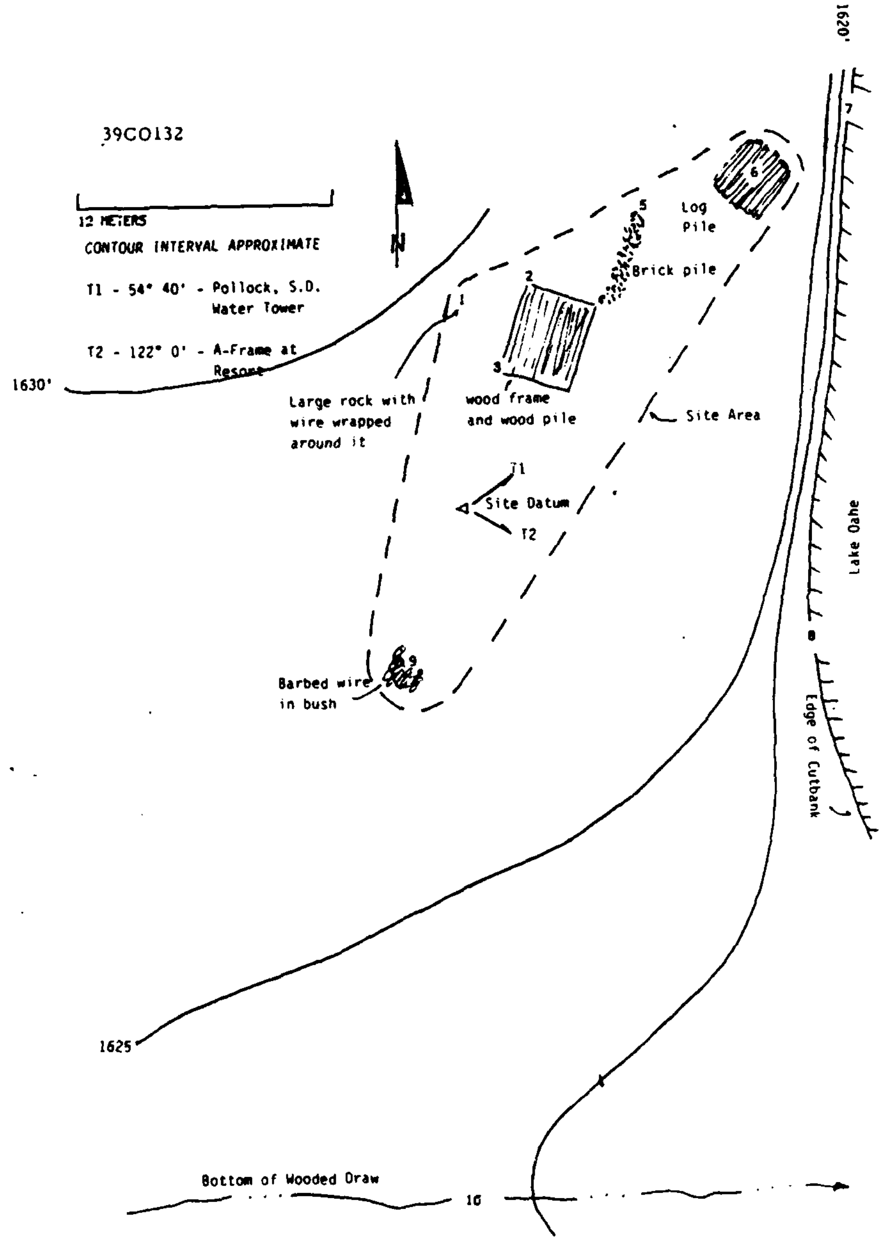

Figure 75. Map of 39CO132.

Louisa Lowdog Hager. Upon her death on July 29, 1953, this land was subdivided between five heirs. The ownership was consolidated in 1958 when acquired by the U. S. Government for Oahe Reservoir.

No further information is likely to be obtained from this site. Therefore it is not believed to be eligible for nomination to the National Register of Historic Places.

39C0133:

This site consists of two deep depressions located on top of a ridge overlooking Lake Oahe to the east (see Figure 76). The depressions are large and deep and contain shrubs and grasses. Prairie grasses cover the ridgetop and surrounding areas. Except for the two depressions, no other cultural materials were observed, either in or around the depressions. No structures are shown on any GLO or topographic maps.

The chain of title search indicates that this location was a portion of a Trust Patent allotment to Mrs. Standing Soldier on October 3, 1907. Upon her death on July 15, 1937, the land was transferred to her grandnephew, Lawrence Bearsheart, who held it until acquired by the U. S. Government in 1958.

A Standing Soldier was a judge on the Standing Rock Reservation in the late nineteenth century. His connection with this site should be established through archival research and informant interviews. Test excavations to determine the age and function of the depressions should be completed prior to a formal determination of eligibility for nomination to the National Register of Historic Places.

39C0134:

This site is situated on a small knoll north of the Jake White Bull site (39C06) (see Figure 77). The site consists of a 3 X 4m depression containing historic debris and a scatter of materials around the depression. The entire site area measures approximately 8 by 10 meters. The materials include lard buckets, china, a gas can, galvanized and enameled pots and buckets, pink and green bottle glass, uncut bone (bovid), stove parts and seam cans. There are no structural remains present, although two historic occupations occur within one half mile of this site and ultimately may have associations with it.

The chain of title search indicates that this land was a part of a Trust Patent allotment to James Highbear issued on October 3, 1907. Upon his death in 1909, the land was transferred to his mother, Mrs. Highbear or Gray Eagle. She died on December 1, 1933 and left it to Mrs. Black Hoop, her daughter. It was acquired by the U. S. Government for the Oahe Reservoir take area in 1958.

Although the age of this apparent trash dump is not precisely known the edges of the depression are exposed soil without vegetation and the cultural materials are not of any discernable antiquity or uniqueness. As a result, this site is not considered eligible for nomination to the National Register of Historic Places.

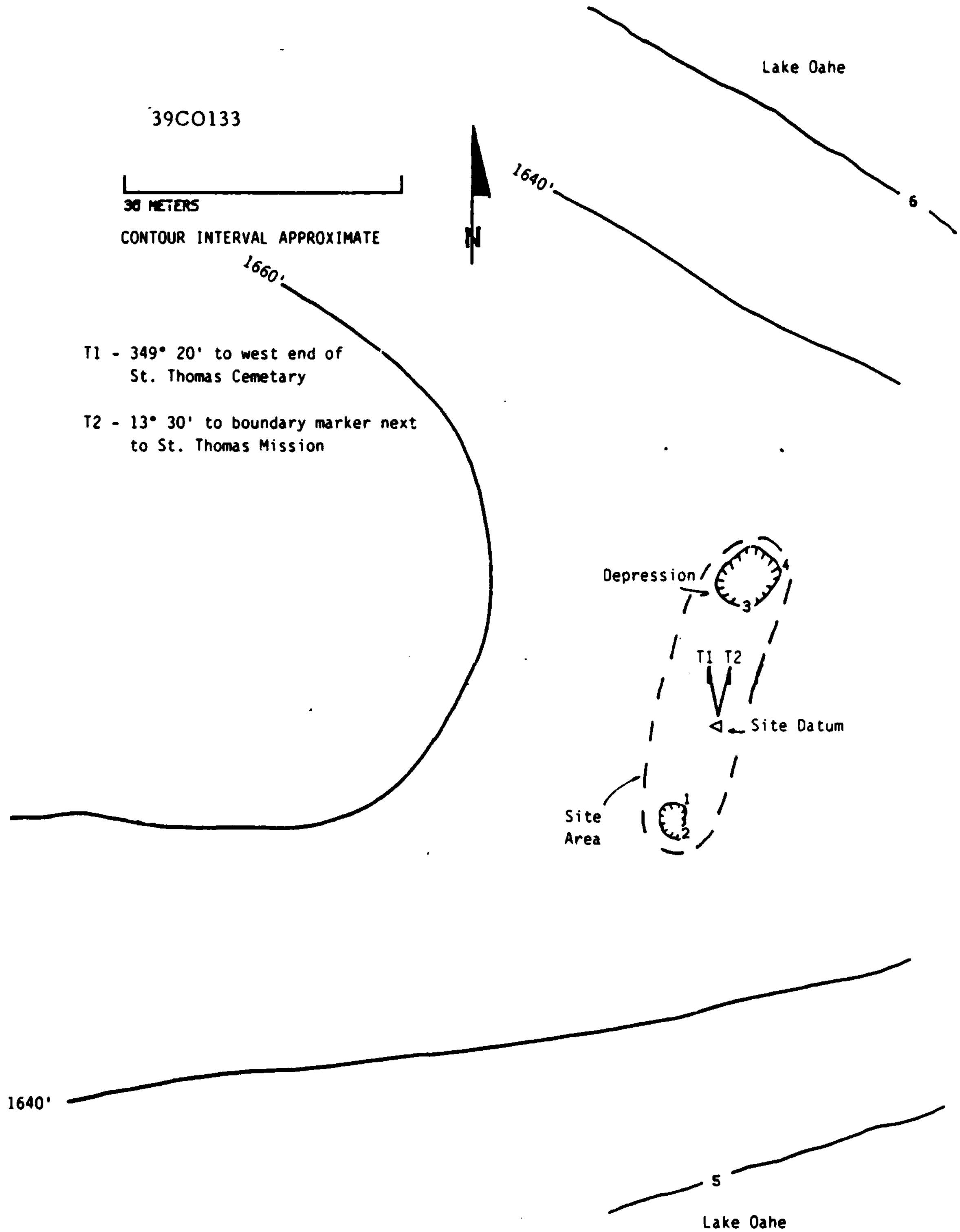

Figure 76. Map of 39CO133.

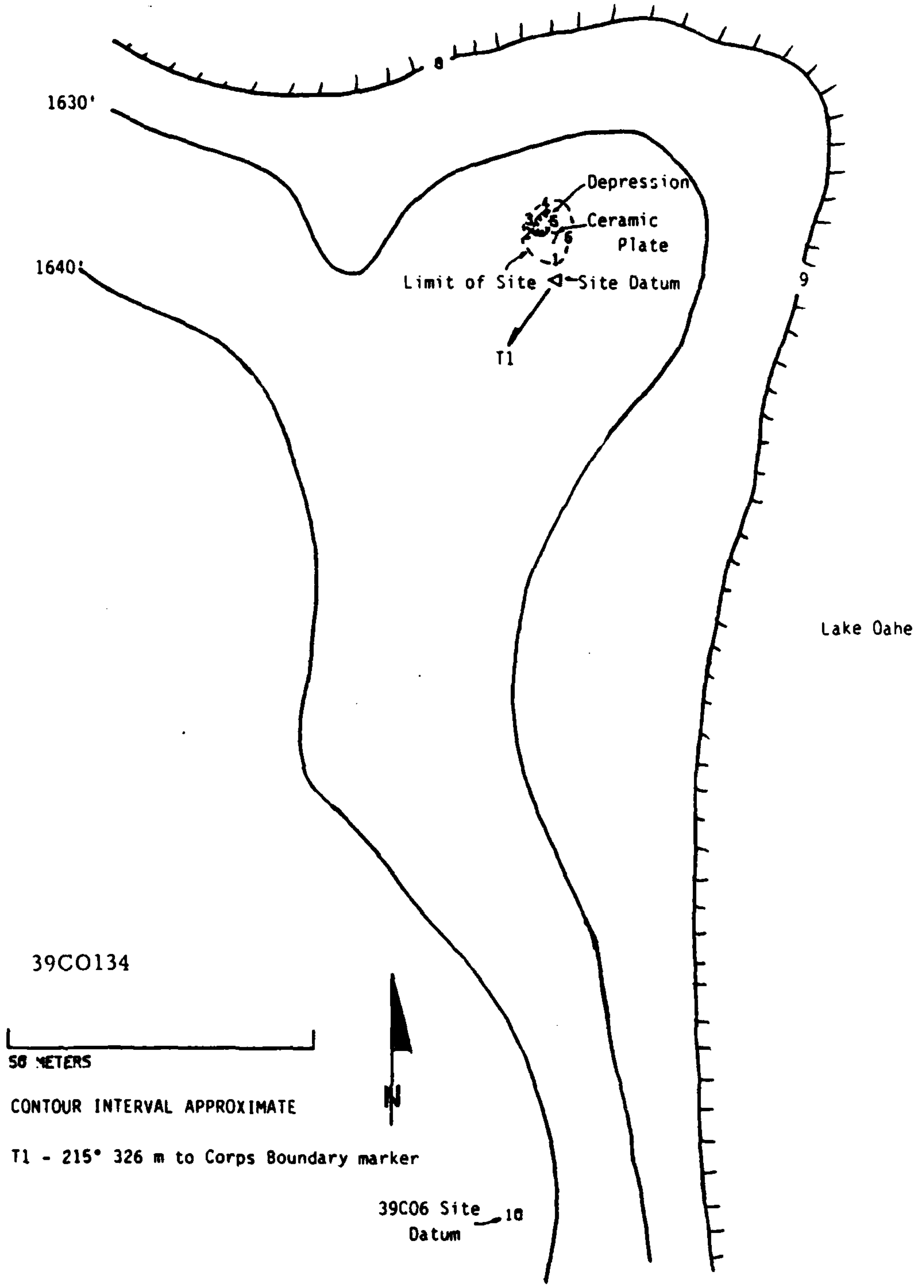

Figure 77. Map of 39CO134.

39CO135:

The cultural materials at this site include a single large depression and a small amount of scattered debris. The depression is cut into the gently east-facing slope of a hill above Lake Oahe (see Figure 78). The depression is quite old since a number of trees are growing within it. A number of rusted seam cans occur within the depression while a blue enameled coffee pot and a trash can lid were observed to the south of the depression. A faint two track occurs to the west of the site. The cutbank of Lake Oahe forms the eastern edge of the depression indicating that this portion of the site is undergoing immediate adverse impact.

No structures are shown at this location on the 1903 GLO Plat. This land was a part of a Trust Patent allotment issued to Benjamin Bobtail Bear on October 3, 1907. Upon his death on April 28, 1922, it went to William End of Horn. The latter died on November 15, 1955 and divided the land between five heirs. The ownership of this land was consolidated when obtained by the U. S. Government in 1958.

Test excavations are recommended to determine the age and function of the depression in order to ameliorate the loss of information through cutbank erosion. Using the information obtained from this testing, a determination of eligibility for nomination to the National Register of Historic Places should be made.

39CO136:

This historic site consists of a large depression dug into the east side of a small hill and another feature exposed in the cutbank of Lake Oahe (see Figure 79). The latter feature is approximately two meters long and extends 60 centimeters below the surface and occurs on another small hill which has been dissected by wave erosion. The feature is marked by a distinct dark gray unconsolidated loam which differs considerably from the normal carbonate-rich brown clay loam substratum. No cultural materials were observed within this feature and no depression is evident on the ground surface. The nature of this feature is not known.

In addition to these features, a buried historic cultural level was observed in the cutbank in 1985 occurring approximately 20 meters to the east of the buried feature. High lake levels and wave action have destroyed this buried cultural level which contained cut bone, glass and ceramic fragments. Additional glass bottle fragments dating to the early 1900s were also observed on the beach in 1985 which was underwater in 1986.

No structures are shown on the 1903 GLO Plat or any other topographic maps although a road passes through the site area on the GLO plat. The chain of title search indicates that this land was a part of a Trust Patent allotment to Joseph Crowfeather. He died on April 20, 1907 and left the land to his son, Francis Crowfeather. The U.S. Government acquired the ownership in 1958.

Test excavations are recommended to determine if additional buried cultural deposits are present as well as the age and function of the depressions prior to making a formal determination of eligibility for nomination to the National Register of Historic Places. In addition, the

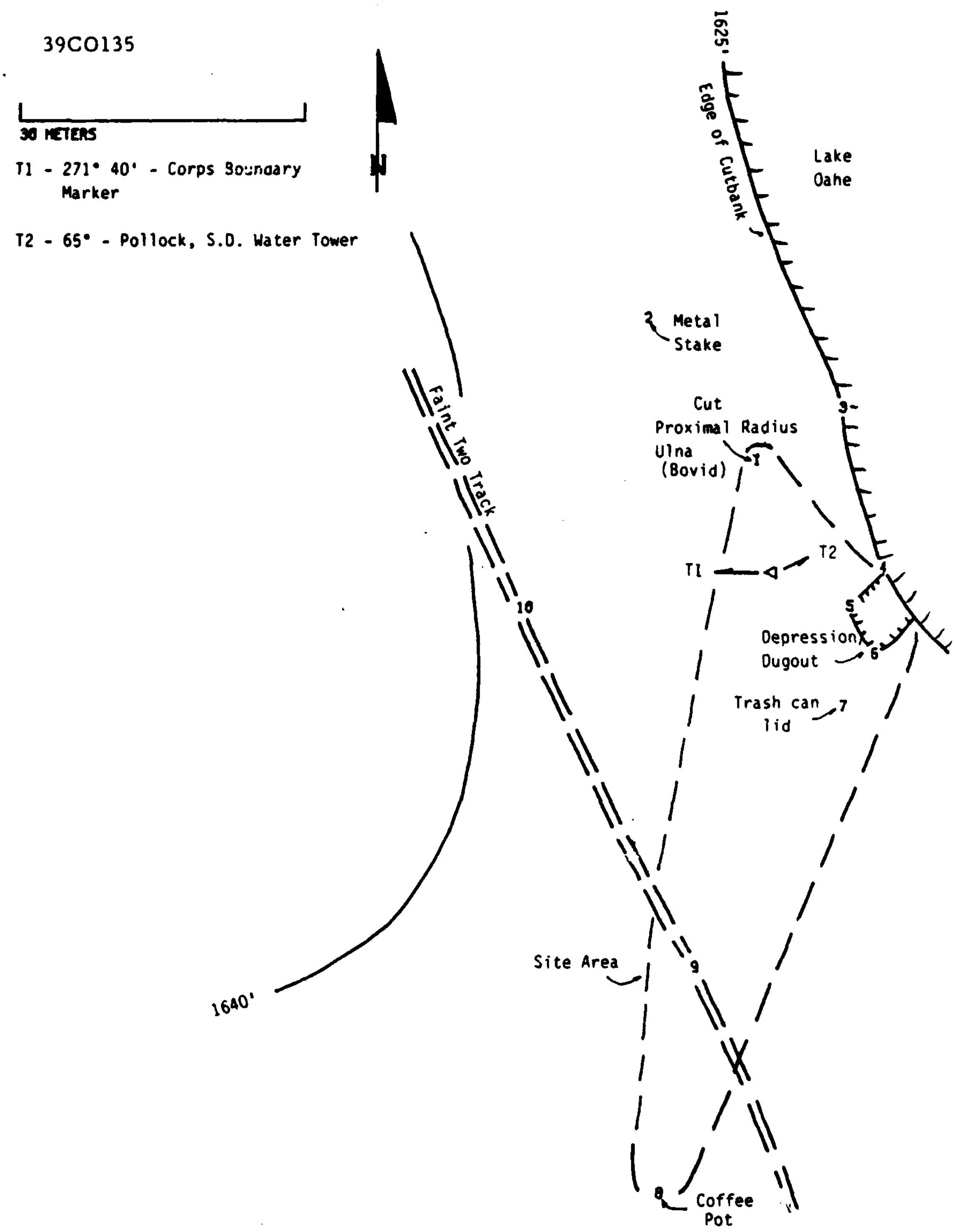

Figure 78. Map of 39C0135.

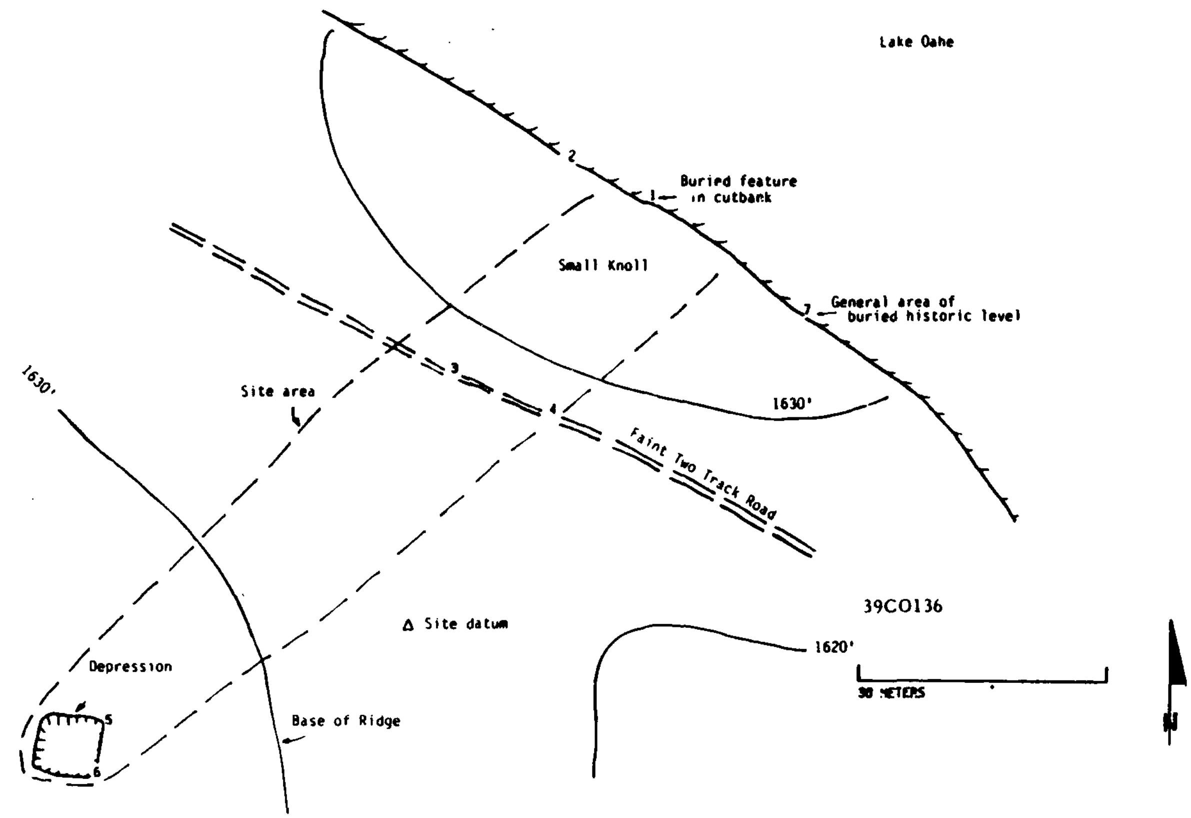

Figure 79. Map of 39CO136.

function of the small feature in the cutbank should be established. Test excavations should take place immediately as the site is undergoing considerable loss of information as the result of cutbank erosion.

39C0137:

This site consists of two depressions and a possible stone foundation located on the lower slope of a hill next to Lake Oahe (see Figure 80). Vegetation consists of a mixture of prairie grasses and cheatgrass. The larger of the two depressions is approximately 1.5 meters deep while the other is 1 x 2 meters in size and 50 centimeters deep. The possible stone foundation consists of a few large rocks of local stone in the four corners and a few other rocks scattered inbetween. One seam can was also observed.

No structures are shown at this location on any maps. The chain of title search indicates that this location was issued to Steven Crowboy on October 3, 1907 as a part of a Trust Patent allotment. In May 1909, it was subdivided between six heirs and later resubdivided. It was then reconsolidated when acquired by the U. S. Government in 1958 as a part of the Oahe Reservoir take area. This site should be tested in order to establish the age and function of the structure and depressions prior to making a formal determination of eligibility for nomination to the National Register of Historic Places.

39C0138:

This site consists of five depressions and a cement foundation situated on a gentle slope of the valley south of Hunkpapa Creek (see Figure 81). The site is immediately to the west of a small ephemeral drainage. The depressions vary widely in size and depth. Two of the depressions contained additional cultural materials. Feature 1 contained a rusted metal bucket and a wood post while Feature 5 contained a large amount of rusted metal seam cans and more recent aluminum beer cans and plastic jugs. The latter feature evidently served as a trash dump.

Feature 6 consists of the remains of a cement and native stone foundation which extends approximately 20 centimeters above the surrounding surface. The stones in the foundation are quite small and constitute a minor proportion of the foundation.

Three structures are shown at this location on the 1947 Corps of Engineer's maps. The chain of title indicates that this land was a part of a Trust Patent allotment to Joseph Walking Elk issued on October 3, 1907. He died on March 7, 1919 and left it to Mrs. Maude Walking Elk. Upon her death on August 24, 1937, it was left to her son, Mark Walking Elk. He died on March 8, 1947 and left it to six heirs. It was consolidated when acquired by the U. S. Government in 1958. Test excavations are recommended to determine the age and function of the depressions as well as to examine their potential for containing buried cultural deposit. As a result the site should be considered potentially eligible for nomination to the National Register of Historic Places.

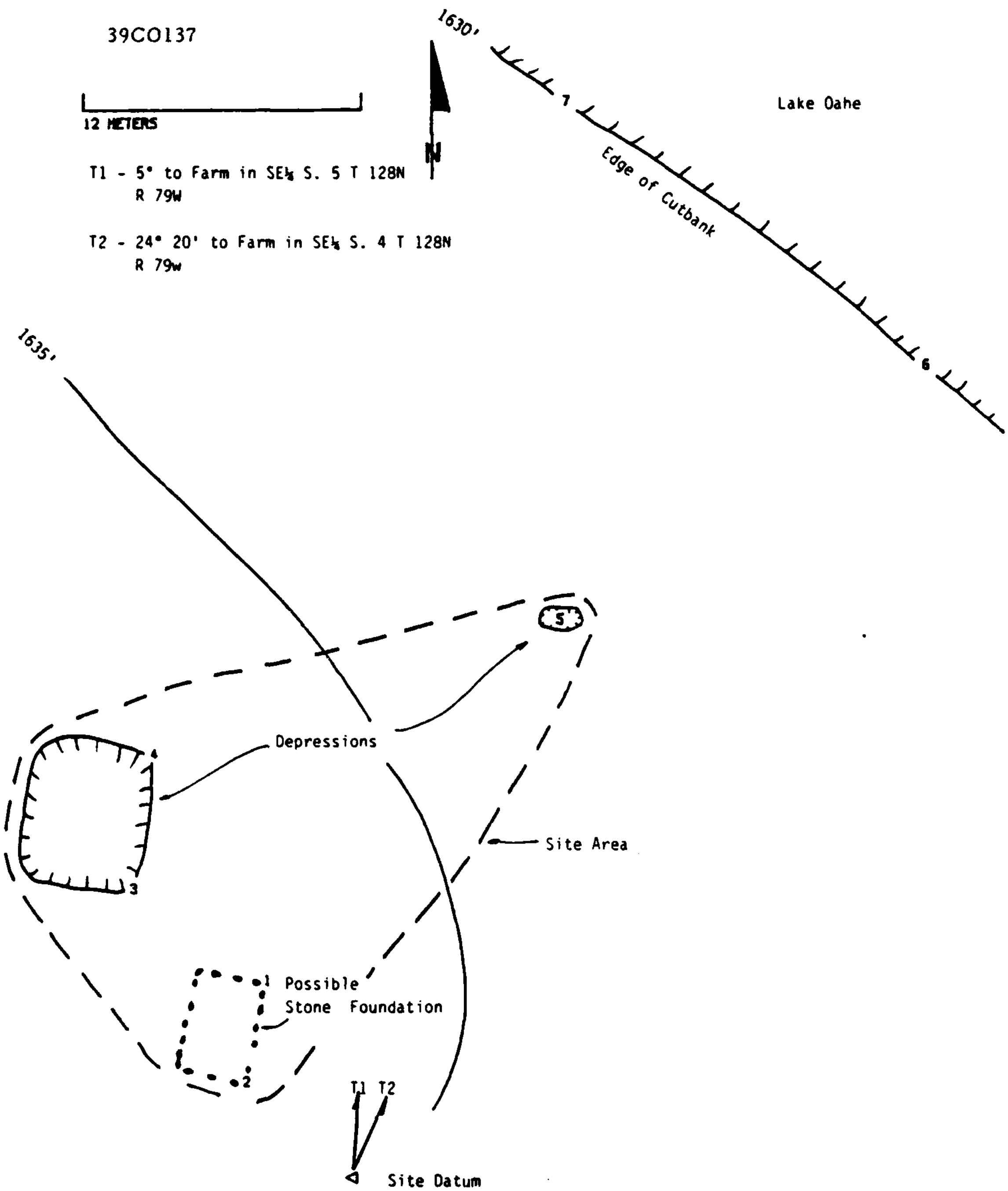

Figure 80. Map of 39CO137.

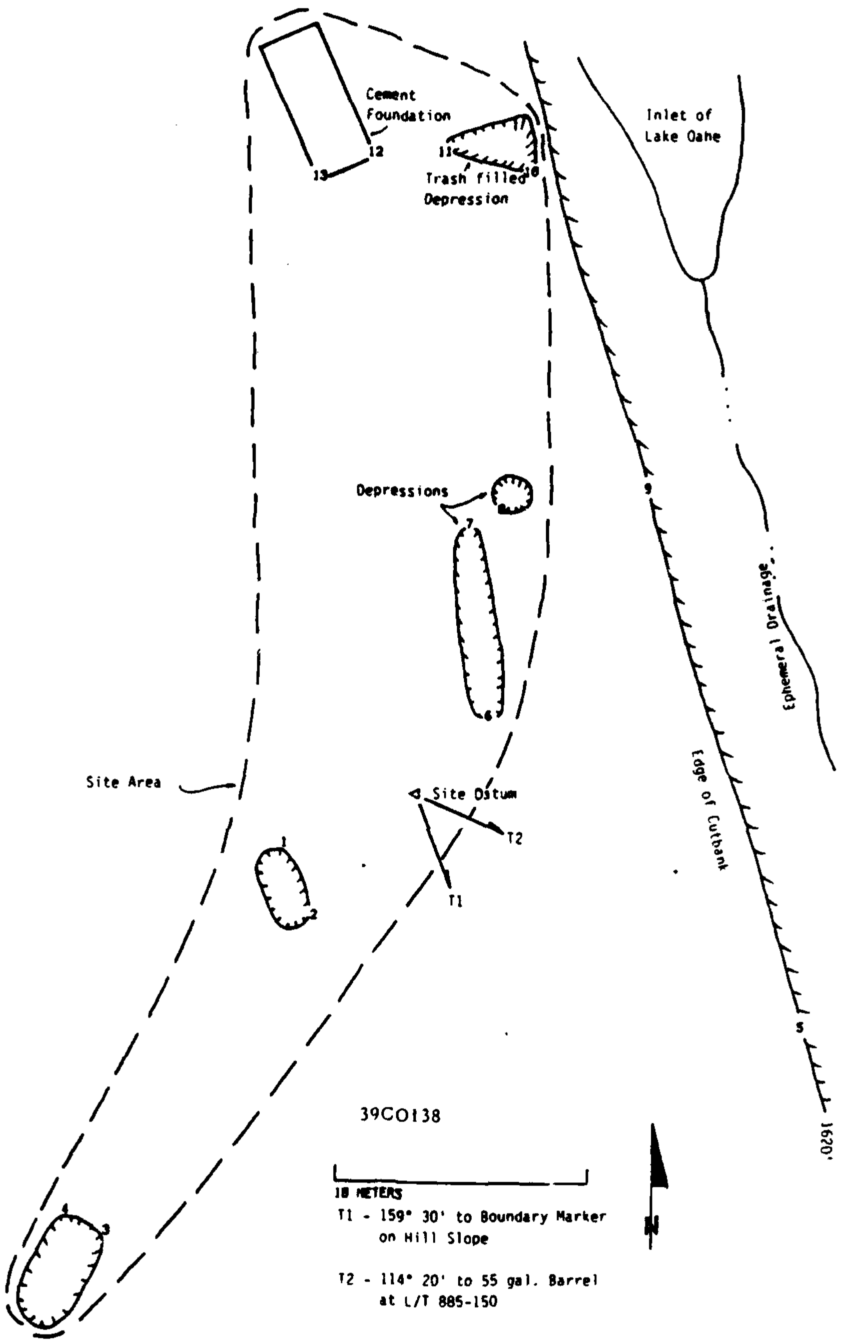

Figure 81. Map of 39C0138.

39C0139:

This site consists of two depressions and a scatter of historic debris situated on a gentle slope above Hunkpapa Creek (see Figure 82). Cheatgrass and prairie grasses are the dominant vegetation. The larger of the two depressions is approximately 70 centimeters deep and contains the hub of a wooden wagon wheel and a metal container. The other shallow 1 x 3 meter depression contains a metal pipe and numerous logs or wood posts. Additional materials are scattered throughout the site area and include cut bone, a metal wagon wheel rim, lumber, enameled metal cook ware and a 55 gallon barrel. A 5 x 5 meter concentration of rusted metal seam cans also occurs on the site adjacent to the large depression.

No structures are shown at this location on any topographic maps. The chain of title search shows that this location was a part of the same allotment as previously discussed for site 39C0138. This site should be tested to determine its age and the function of the depression prior to making a formal determination of eligibility for nomination to the National Register of Historic Places.

39C0140:

The cultural remains at this site consist of two widely separated depressions and two hay rakes situated on a flat terrace next to Lake Oahe (see Figure 83). The easternmost depression has been used as a trash dump and contains a large amount of seam cans, a galvanized metal wash tub and brown and clear glass bottles of modern automatic manufacture. No structural remains were observed.

These features is not known but they may be associated with some of the habitations located within the general vicinity of the site on the 1903 GLO Plat and 1947 Corps of Engineers topographic map. However, the location of this site is shown to be on lands belonging to the Standing Rock Sioux Tribe according to the chain of title search and was not allotted to any one individual.

The cultural materials within the trash dump probably date from the 1940s to the present and do not appear to be of sufficient antiquity or distinctiveness to warrant any additional work at this site. Therefore the site is not considered eligible for nomination to the National Register of Historic Places.

39C0141:

This historic site consists of two depressions and an old hay rake situated on a flat terrace next to Lake Oahe (see Figure 84). Prairie grasses occur throughout the site area with cottonwoods formerly occurring in the adjacent river bottoms. Both of the depressions are small with one of them containing a 1.5 by 1.5 meter piece of rusted sheet metal. No structural remains were observed, however a number of structures are shown on the 1947 Corps of Engineers' topographic maps in the general vicinity of this site. It is possible that these depressions are associated with these other habitations.

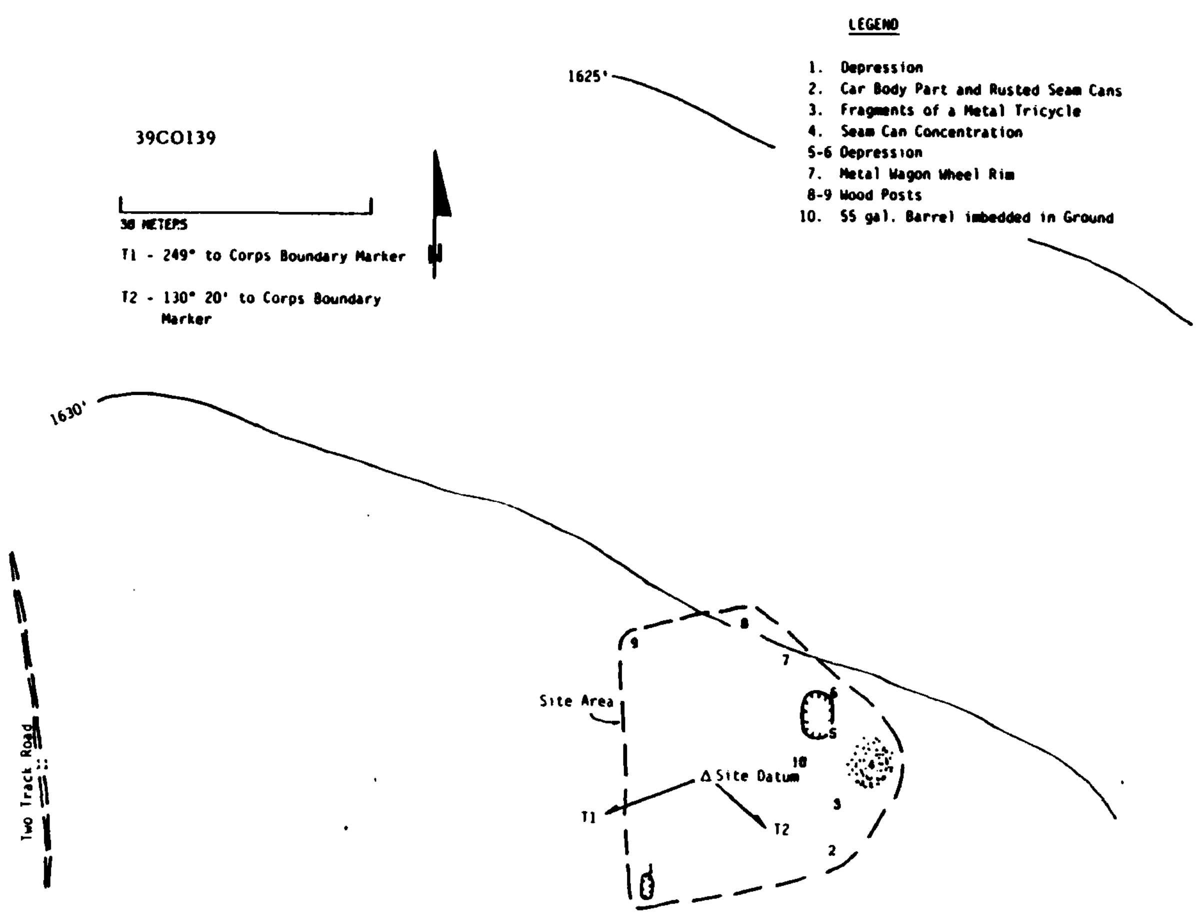

Figure 82. Map of 39CO139.

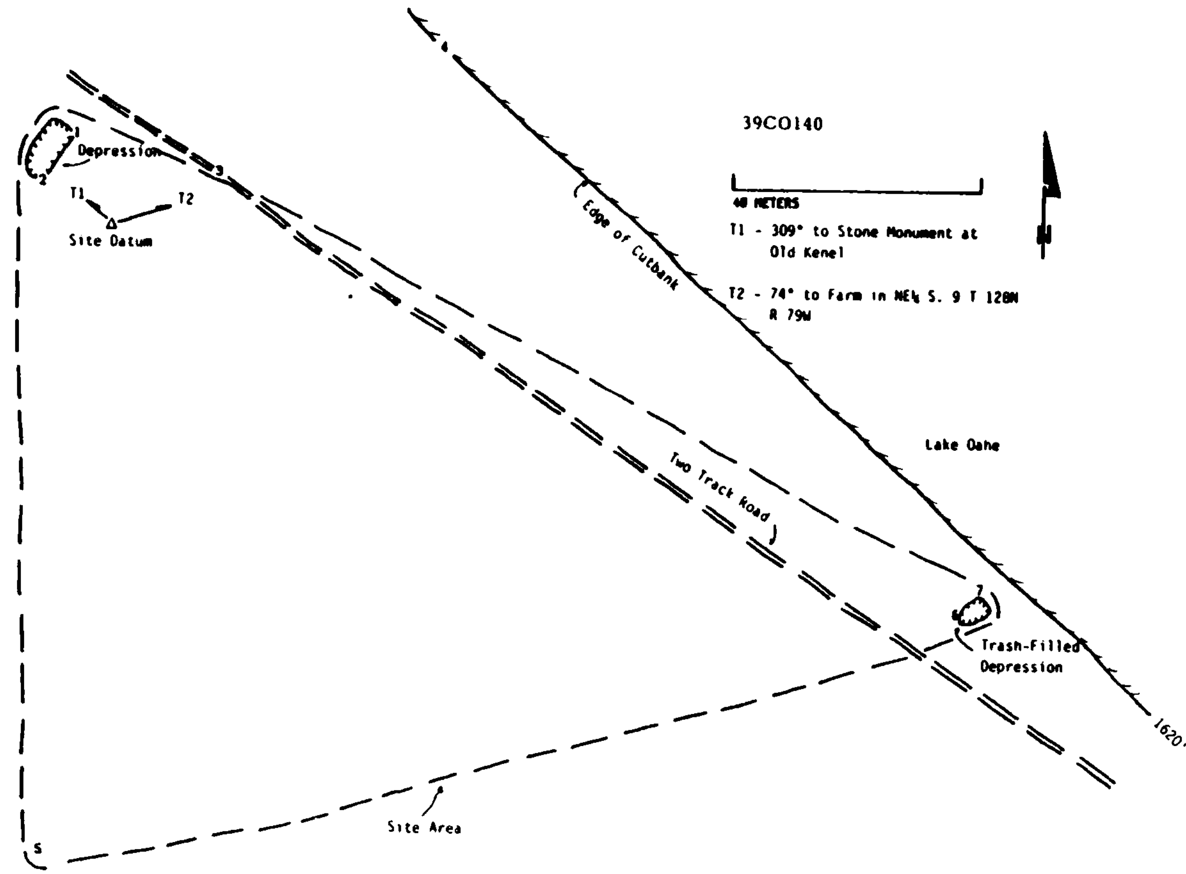

Figure 83. Map of 39CO140.

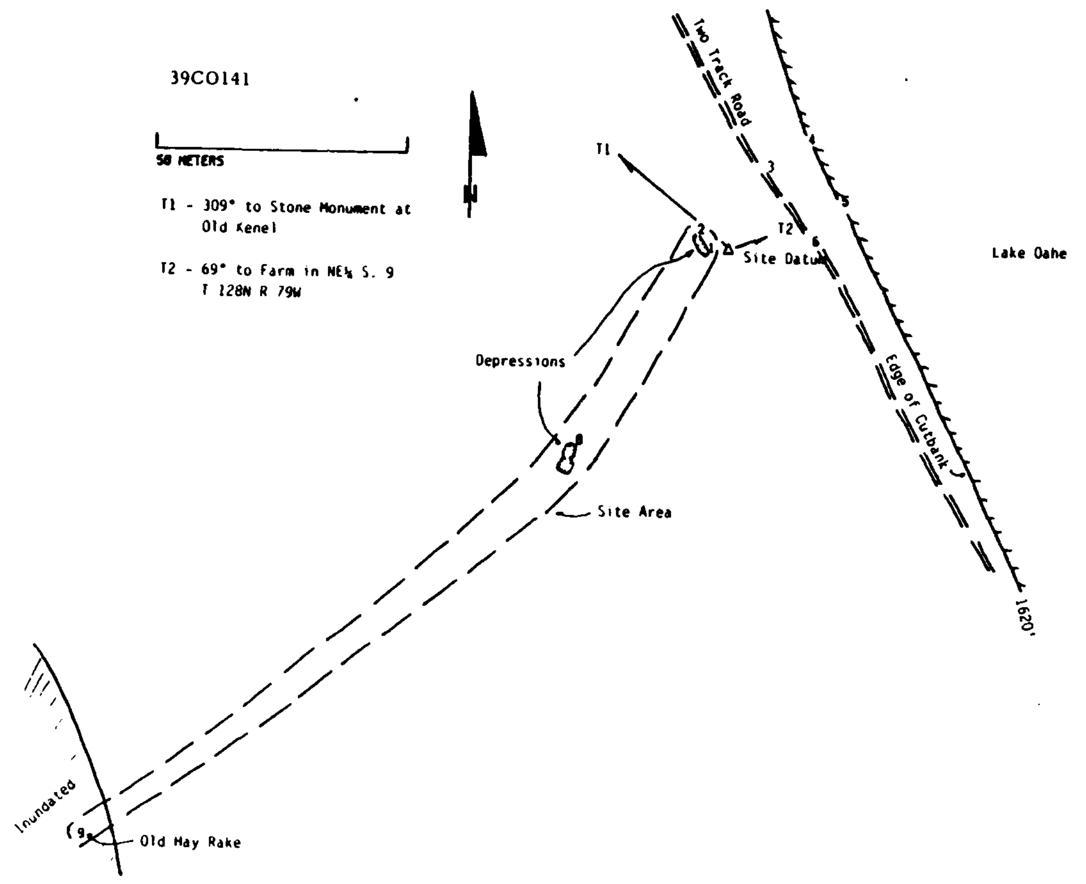

Figure 84. Map of 39CO141.

The chain of title search indicates that this location was issued as a part of a Trust Patent allotment to Mrs. Mary Iron Horn on October 3, 1907. She died on February 10, 1929 and left the land to Maggie Shoot the Bear, who left it to Maurice Shoot the Bear on February 1, 1939. He died on August 4, 1941 and left it to Guy (Garfield) Shoot the Bear who held it until acquired by the U. S. Government in 1958.

The small size of the depressions, their wide distribution and lack of any associated or distinctive cultural materials suggests that the site does not represent a habitation or other type of feature warranting any additional work. Therefore, the site is considered not eligible for nomination to the National Register of Historic Places.

39CO142:

This site is the remains of the St. Thomas Mission which is located on the top of a high bluff overlooking the former Missouri River valley to the east (see Figure 85). Most of the site area is covered by prairie grasses with a few scattered hardwoods. The majority of the site, including a cemetery, occurs on private land. Features present within Corps property include a large cement foundation and a large depression. The depression is steep-walled and contains an eight inch diameter bur oak tree. Although the tree growing within the depression indicates considerable antiquity, the steep wall of the depression suggest a more recent origin. It is possible that the feature is a sinkhole which has recently collapsed although further investigation would be necessary to accurately determine its origin.

The foundation is quite substantial, containing an interior foundation which bisects the feature. An entrance or porch occurs on the western side of the foundation towards the other building remains. A structure is shown in this general location on the 1903 GLO Plat but it is not known if this is related to the mission or is a homestead. The 1947 Corps of Engineers topographic map (Sheet 116) shows a church in the location of the large foundation and three other buildings to the west of the church. The chain of title search indicates that the land was issued as Patent Record No. 4 to the Domestic and Foreign Missionary Society of the Protestant Episcopal Church in the United States of America on November 13, 1917. The land was acquired by the U. S. Government for Oahe Reservoir in 1958.

Further archival research should be completed in order to establish the history and significance of the St. Thomas Mission prior to making a formal determination of eligibility for nomination to the National Register of Historic Places. The portions of the site located off Corps of Engineers property, including the cemetery, should be included in the archival research. It is possible that additional buried cultural deposits occur in the vicinity of the buildings which have been obscurred by the thick vegetation. Therefore, test excavations should also be conducted in order to determine if buried cultural deposits are present and their extent, particularly on Corps land.

In addition to the historic sites described above, five other historic sites were not formally recorded due to higher lake levels in 1986 (see Chapter Five). These sites are described below and all occur in areas which are normally inundated. No standing structures are present at any of

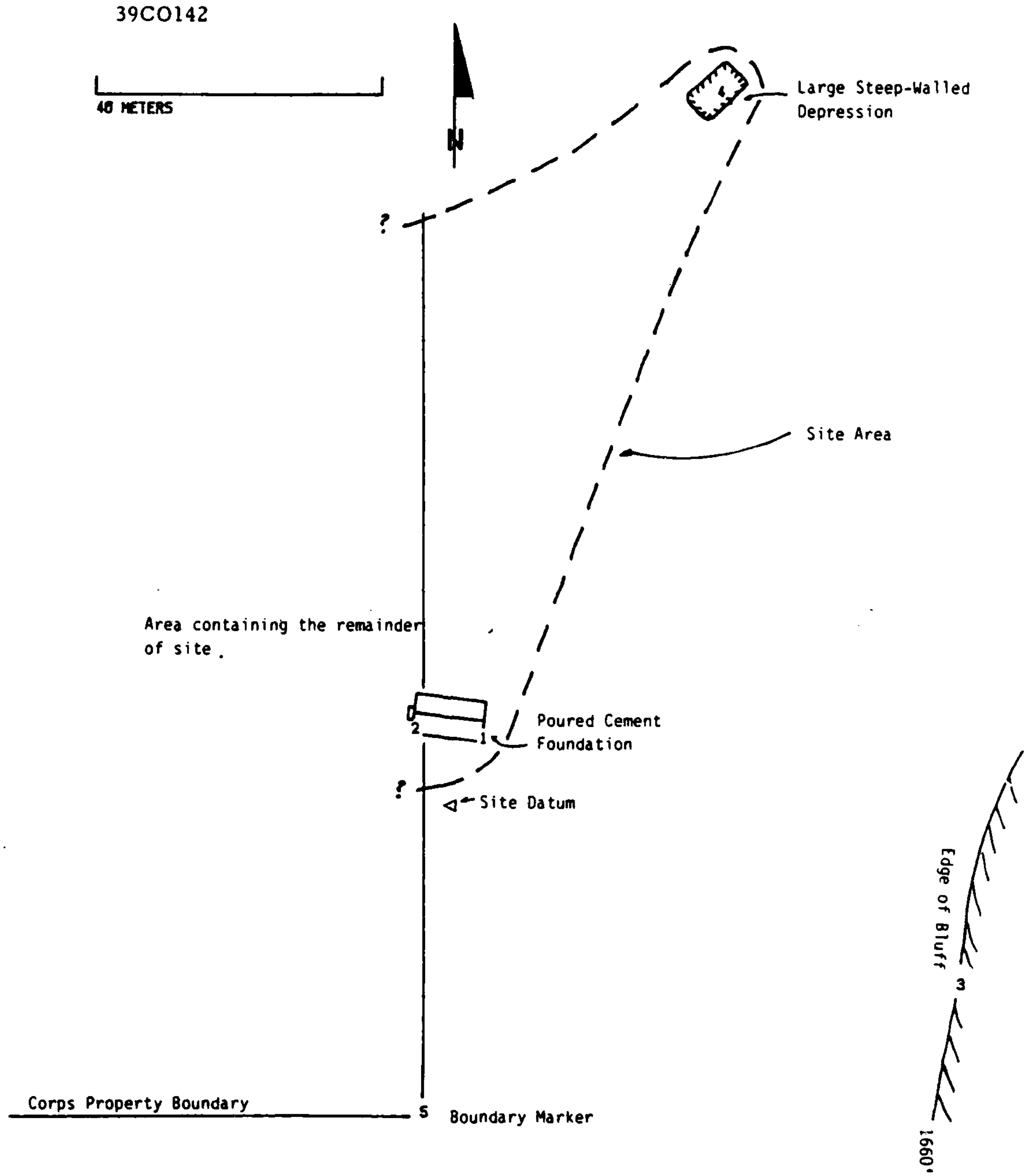

Figure 85. Map of 39CO142.

the sites. Although these sites were only briefly visited, frequent inundation has definitely compromised the physical integrity of these five sites. The documents search indicated that only one (L/T 885-144) was associated with any individual important in the history of the area. Based on these findings, no further work is recommended on the first four sites described below. Additional information, however, could be gained from the archival research into Chief John Grass' apparent occupation at L/T 885-144. The latter site is therefore considered potentially eligible for nomination to the National Register of Historic Places. Locational information is provided in Volume 2, Appendix A.

L/T-885-2: This site consists of two dressed stone foundations, a depression and scattered cultural material situated on the Grand River bottomlands. The chain of title indicates that this land was originally a part of Allotment 140, a trust patent to John Loneman issued on October 3, 1907. It was transferred to his wife, Mrs. Mary Loneman on October 20, 1932. On May 4, 1938 it went to Agnes Loneman Elk Eagle and was later transferred to Thomas Elk Eagle, Benjamin L. Elk Eagle and Mary Agnes Red Bird on September 1, 1947. The land was acquired by the U. S. Government in 1958.

L/T-885-3: This site is also situated on the Grand River bottomlands and consists of one cement and one dressed stone foundation with some scattered historic debris. The chain of title indicates that this land was a part of Allotment 265, an unnumbered trust patent issued to John M. Lookenback or Bear Looking Back. The original allotment was cancelled on October 3, 1907 and assumed by the Standing Rock Sioux Tribe until 1958 when it was acquired by the U. S. Government. Additional information concerning the possible occupant(s) of this site or specific ownership is not specified by the chain of title search.

L/T-885-5: This site consists of a single depression located on the Grand River bottomlands. The 1956 U. S. G. S. topographic map shows an occupied structure at this location. Other than the depressions, no structures or structural debris was observed at this location. This site may be associated with a historic trash scatter approximately 200 m to the south (see 39CO118). The chain of title search is the same for both sites.

L/T-885-8: This site consists of a single depression with scattered historic debris situated on the edge of the Grand River bottomlands. Additional structures noted on the 1956 U. S. G. S. topographic map have probably been removed and the foundations covered by silt. No trust patent was issued for this land and was retained by the U. S. Government.

L/T-885-144: This scatter of historic debris is situated along John Grass Creek and immediately to west of 39CO1. The site consists of a sparse scatter of metal, glass and cement blocks. This area is normally inundated. It is suggested that evidence of structures such as foundations or depressions may be covered by silt. The chain of title indicates that the land was a part of an allotment issued as a trust patent to John Grass on October 3, 1907. Upon his death on May 10, 1918, he left the land to his wife, Amanda Grass and Annie Two Bears, his daughter-in-law. The land was later subdivided between 10 heirs.

Robinson (1925:330) notes that:

> Grass, John (Charging Bear), 1837-1918; civil chief of the Blackfeet Sioux, and treaty chief of Standing Rock Reservation. He was adroit and intelligent, always opposed to contention with the government; an orator of tremendous power and unlimited influence with his people in all civil affairs. Of John Grass, Gen. Charles Foster, of Ohio, chairman of the Federal Commission of 1889 said: "At Standing Rock we met a man whose strong sense would be conceded anywhere and who struck me as an intellectual giant in comparison with other Indians. He is known to the whiteman as John Grass and to the Indians as Charging Bear and by reason of superior mind is the most prominent Indian on the reservation. He could not be the leader he is, however, were he not known to be brave. His speech in answer to the proposition we submitted to his tribe for possession of a part of their territory was by far the ablest [sic] we heard by any chief. His speech shows that he understood the treaties and acts of congress beyond the grasp of most Indians".

Isolated Finds

Eighteen isolated finds were recorded during the 1985 cultural resource inventory. These items are presented in Table 14. Five of the artifacts were assigned Smithsonian numbers by the South Dakota Archaeological Research Center. Each of these artifacts are more fully described below. None of the isolated finds are considered eligible for nomination to the National Register of Historic Places.

39CO110:

This is an isolated find located approximately 95 meters southeast of site 39CO109 on the same ridge. The artifact consists of a single large mammal incisor with a groove cut around the root portion. The artifact was found one meter from a cutbank formed from slumping. An examination of the cutbank profile failed to locate any additional cultural material. Due to the lack of any additional cultural material, no further work is recommended.

39CO111:

This isolated find consists of a corner-notched slightly convex based, projectile point of Knife River flint and is missing its tip (see Figure 51b). The point is similar to Pelican Lake forms which Reeves (1983:80-81) believed lasted from approximately 3000-1900 years B.P. (Before Present). The point was found at the grass-covered base of a ridge near the Lake Oahe beach located to the east. Due to the lack of any additional cultural materials, no further work is recommended.

39CO112:

Table 14. List of isolated finds

Isolated Find Number	Field Number	Description	Temporal Affiliation
39CO110	IF-L/T 885-11	Grooved Mammal Incisor	Unknown
39CO111	IF-L/T 885-6	Small Corner-Notched Projectile Point	Pelican Lake
39CO112	IF-L/T 885-4	Euroamerican Gunflint	Historic
39CO113	IF-L/T 885-2	Lanceolate Stemmed Projectile Point	Paleoindian
39CO114	IF-L/T 885-7	Large Side-Notched Projectile Point	Early Plains Archaic
	IF-L/T 885-1	Fire-cracked Rock	Unknown
	IF-L/T 885-3	Petrified Wood Primary Flake	Prehistoric
	IF-L/T 885-5	"Davis Vegetable Painkiller" bottle	Historic
	IF-L/T 885-8	Tongue River Tertiary Flake	Prehistoric
	IF-L/T 885-9	Smooth Body Sherd	Prehistoric
	IF-L/T 885-10	Biface Fragment	Prehistoric
	IF-L/T 885-12	Quartzite Primary Flake	Prehistoric
	IF-L/T 885-13	Chalcedony Primary Flake	Prehistoric
	IF-L/T 885-14	Chalcedony Primary Flake	Prehistoric
	IF-L/T 885-15	Chalcedony Primary Flake	Prehistoric
	IF-L/T 885-16	Petrified Wood Tertiary Flake	Prehistoric

Table 14. Continued.

IF-L/T 885-17	Petrified Wood End Scraper	Prehistoric
IF-L/T 885-18	Tongue River Primary Flake	Prehistoric

This is an isolated gunflint of gray translucent chert (Figure 51c) which was located on the upper slope of a large ridge overlooking an ephemeral drainage valley. The valley contains various hardwoods, shrubs and prairie grasses. The view afforded by the location of the gunflint would be favorable for hunting. The gunflint appears to be of Euroamerican origin due to the presence of a Hertzian cone on the dorsal face (see Figure 51c, contour of top margin) which is the result of applied fence commonly produced by pinchers or pliers used to snap off individual gunflints. The gunflint may be English in origin as the raw material resembles the light gray variety of Dover chert. This process was utilized in the mass-production of the gunflint (Torrence 1986:71-73). No further work is recommended due to the lack of any other associated cultural materials and low potential for buried cultural deposits.

39C0113:

This isolated find is the only artifact representative of the Paleoindian period within the present project area. This complete heavily-patinated Knife River flint projectile point was found among the boulders and gravels of the Lake Oahe beach approximately 200 meters northeast of site 39C031. An examination of nearby cutbanks failed to locate any additional cultural materials within the nondistinct aeolian and colluvial sediment which could have been the source of the artifact.

The projectile point appears to be a reworked, Scottsbluff-like Cody Complex type point (see Figure 51d). The reworking is in the form of fine parallel oblique flaking of the blade which has subsequently removed any shoulders but has left the slightly ground parallel-flaked base relatively untouched. Parallel-oblique flaking is fairly distinctive of late Paleoindian period projectile points (Frison 1978:34-40; Irwin-Williams et al. 1973:50). Due to the lack of integrity and associated cultural materials or stratum, no further work is recommended.

39C0114:

This isolated find was found on the gentle lower valley slope near Blackhawk Creek. The slope is sparsely covered with prairie grasses due to a shalely subsoil while scattered hardwoods occur along the creek and adjacent draws.

The isolated find consists of a large side-notched projectile point with a slightly ground base, made of Smooth Gray Tongue River Silicified Sediment (see Figure 51e). The point is missing only its tip and is similar to Early Plains Archaic forms (see Ahler et al. 1977:Figure 13m; Frison 1978:Figure 2.5h). No further work is recommended due to the lack of any associated cultural remains and shallow soil.

CHAPTER EIGHT
LITHIC RESOURCE UTILIZATION

Paul H. Sanders

Introduction

One of the questions to be addressed by this project concerns potential patterning in prehistoric lithic raw material or resource utilization. The selection of this particular question was considered applicable to the project area because of Ahler's (1977b) earlier study of resource utilization at four Plains villages in the immediate vicinity of the project area. Ahler (1977b) found that the Extended Middle Missouri villages, Jake White Bull (39C06) and Helb (39CA208) primarily utilized sources to the north and west (i.e., Knife River flint or Smooth Gray Tongue River Silicified Sediment) while the Extended Coalescent villages, Lower Grand (39C014) and Walth Bay (39WW203) contained a wide variety of raw material types primarily derived from areas to the south and southwest.

Research Questions

The data derived from the sites investigated during the present project provide an opportunity to test Ahler's (1977b) results. Specific questions which will be addressed in this analysis are presented below.

1) Are the differences in lithic resource utilization merely due to the geographic proximity of the sites to the sources? This would mean that all sites in the northern part of the project area would be dominated by Knife River flint.

2) Are there temporal differences in lithic resource utilization?

3) Do lithic resource utilization patterns differ between Coalescent and Middle Missouri villages (i.e., Ahler 1977b) and identified Coalescent and Middle Missouri non-earthlodge village sites?

The data to be used to address these questions is derived from 24 prehistoric artifact scatters. This sample was selected primarily because raw material types were best described on these sites (see Chapter Five Site: Recording Techniques). Individual site sampling biases are presented in Table 15 with data on raw material frequencies presented in Table 16. The information in Table 15 was not included in the analysis. It should be noted that at sites not completely analyzed, the field observations on many of the concentrations do not differ substantially from the analyzed raw material frequencies.

Another reason for selecting these sites are that they have been typically ignored in most analyses due to sample size (cf. Toom 1984) or merely described as isolated finds (Toom and Artz 1985). Steinacker

Table 15. List of sites with sampling biases.

Site Number	Description
39C080	Two concentrations not analyzed.
39C081	One concentration not analyzed.
39C083	Two concentrations not analyzed.
39C093	One concentration not analyzed.
39C099	Three concentrations of Knife River flint and chalcedony flakes not analyzed.
39C0103	One concentration of 20 Knife River flint and chalcedony flakes and one concentration of 25 Knife River flint flakes not analyzed.
39C0105	Number of flakes estimated.
39C0106	One concentration of 10-20 Knife River flint and chalcedony flakes not analyzed.

Table 16. Tabulation of site raw material types and frequencies.

Site Number		KnifeRiver Flint	Tongue River Yellow/Red	Silicified Sediment Smooch Grey	Agate/ Chalcedony	Miscellaneous Chert	Fine-Grained Quartzite	Coarse Quartzite	Petrified Wood	Totals
39C079	D*	2			1					3
	T**	1U			1B, 2C	1C				5
39C080	D	11	1		12	4	2		2	32
39C081	D		1	1	4	1	1		2	10
	T	1E			1C					2
39C082	D	8	1		6	1			2	18
	T								1E	1
39C083	D	1	1		6		1	2	7	18
	T								1B	1
39C084	D				7	2			5	14
39C086	T	1B			1B	1P				3
39C087	T***			1U						1
	D		1	3	1					7
39C088	D	2	1	3	1					7
	T			1P, 1U, 2C						4
39C093	D			1						1
	T	4P, 2R								6
39C095	D	2								2
	T			1R						1
39C096	D	6	1					2		9
	T	1B	1C	1CH	1C	1C				5
39C097	D	17	4	1		1			1	24
	T	1P, 2B, 1R								4
39C098	D	5			1					6
	T	1R								1
39C099	D	4			7			3		14
	T	1B, 1E, 1R								3
39C0100	D	7			1	1				9
39C0101	D	3		1						4
	T	1C				1P				2
39C0102	D	7	2	1	2	1				13
	T	1P			1E, 1R, 1C					4
39C0103	D	18			6	1		1	1	27
39C0104	D	6			5					11
39C0105	D	ca. 30								30
39C0106	D	3			2			4		9
	T	1C								1
39C0107	D				1					1
	T					2C				2
39C0115	D								9	8
	T	1B							3B	4
Total Tools		22	1	7	9	6			5	
Total Debitage		132	12	8	62	12	4	12	28	
Grand Total		154 (.48%)	13 (.04%)	15 (.05%)	71 (.22%)	18 (.06%)	4 (.01%)	12 (.04%)	33 (.10%)	320

* Debitage
** Tools
*** 2 manos also present at this site

Key: P = Projectile point
B = Biface
E = End scraper
R = Retouched flake
U = Utilized flake
C = Core

(1981:93) however, considers a number of Plains Village artifact scatters as representing "extra-village activity areas" and suggests that they should be considered as a "future working hypothesis." One of the present research questions investigates this latter question. Raw material types utilized in the present investigation are similar to Ahler's (1977b) and have been described previously in Chapter Five.

Discussion

As shown in Table 16, the non-local or exotic raw material types in this sample are Knife River flint and perhaps the smooth grey variety of Tongue River Silicified Sediment. The yellow/red variety of Tongue River Silicified Sediment, petrified wood and coarse quartzite are known to occur locally. The sources of the remaining raw material types are not positively known but may occur locally, and will be considered as such for the present analysis.

The summary percentages for the various raw material types presented in Table 15 show a dominance of Knife River flint. The other remaining percentages are mainly comprised of locally available materials which would be expected if prehistoric peoples practiced some sort of "economizing" behavior (i.e., it is more energy efficient to exploit local versus non-local resources).

The first of the questions to be addressed concerns the premise that the patterns in lithic resource utilization noted by Ahler (1977b) merely reflect the geographic proximity of the examined sites to the various raw material sources. Table 17 has reconfigured the 24 sites on west to east gradients along the Grand River and Oak Creek and south to north along the Missouri River. For comparative purposes, the Grand River was divided into upper and lower portions with sites within the first five miles from the confluence of Grand and Missouri River grouped together. The frequencies in Table 16 do show some general differences between areas but do not show any gradual increase or decrease of raw material usage along the various rivers such as originally proposed. The summary tabulation of the raw material frequencies by area in Table 17 does however show some general patterning. For example Knife River flint constitutes only 27 percent of the assemblages in the upper Grand River area as opposed to 66 percent in the lower Grand/lower Oak Creek area and 60 percent for sites along the Missouri River. Another difference appears to be the increased use of petrified wood in the upper Grand River area. This coincides with and probably reflects the usage of a locally available source (Tim Nowak, personal communication 1985).

The percentage of agate/chalcedony materials is fairly uniform along the Grand River but decreases dramatically in sites along the Missouri River. An increase in other local raw materials coincides with the above decrease.

The overall result of this analysis indicates that geographic proximity to sources such as Knife River flint does not appear to affect the assemblage composition for the investigated sites.

Table 17. Raw material frequencies by geographic area

							Total
39C0101	1(.50)					1(.50)	2
39C0102	7(.54)	1(.08)	2(.15)		2(.15)	1(.08)	13
39C080	12(.32)		1(.03)	2(.05)	15(.41)	7(.19)	37
39C082	9(.45)		1(.05)	2(.10)	7(.35)	1(.05)	20
39C083	1(.05)		1(.05)	8(.42)	6(.32)	3(.16)	19
39C081	0	1(.10)	1(.10)	2(.20)	4(.40)	2(.20)	10
39C0115	1(.08)			11(.92)			12
Subtotal	31(.27)	2(.02)	6(.05)	25(.22)	34(.30)	15(.13)	113
39C0103	19(.61)			1(.03)	9(.29)	2(.06)	31
39C0104	6(.55)				5(.45)		11
39C0105	ca 30(1.00)						ca 30
39C0106	4(.40)				2(.20)	4(.40)	10
39C079	2(.67)				1(.33)		3
Subtotal	61(.71)	0(.00)	0(.00)	1(.01)	17(.20)	6(.07)	85
39C084	0			6(.40)	7(.47)	2(.130	15
39C0100	3(.75)	1(.25)					4
39C0107	0				1(.33)	2(.67)	3
39C098	5(.33)				7(.47)	3(.20)	15
39C099	10(.83)				1(.08)	1(.08)	12
Subtotal	18(.37)	1(.02)	0(.00)	6(.12)	16(.33)	8(.16)	49
Combined Total for Lower Grand River and Oak Creek							
	79(.66)	1(.01)	0(.00)	7(.06)	33(.28)	14(.12)	119
39C085	1(.33)				1(.33)	1(.33)	3
39C087	2(.25)	4(.50)	1(.13)		1(.13)		8
39C088		5(1.00)					5
39C093	8(1.00)						8
39C097	9(.90)				1(.10)		10
39C096	18(.62)	2(.07)	5(.17)	1(.03)	1(.03)	2(.07)	29
39C095	6(.60)	1(.10)	1(.10)			2(.20)	10
Subtotal	44(.60)	12(.16)	7(.10)	1(.01)	4(.05)	5(.07)	73
Grand Total	154(.48)	15(.05)	13(.04)	33(.10)	71(.22)	34(.11)	320

The next question concerns temporal changes in lithic resource utilization. Table 18 presents the raw material frequencies for sites with chronological/cultural diagnostic artifacts. The Middle Plains Archaic period is represented by only one site within the project area. At 39CO103, Knife River flint makes up 61 percent of the assemblage indicating a relatively high reliance on non-local raw material sources. Detailed comparative information is quite limited concerning lithic utilization in Middle Plains Archaic period sites within the Middle Missouri subarea. However, information derived from the excavation of a level dated between 2600-1000 B.C. at 39HU102 south of Pierre, South Dakota indicates that non-local materials comprised only 3.8 percent of the sample (Toom 1984:1-I-14; Steinacker 1984:1-C-22).

Additional information on lithic resource utilization has been more fully described from Middle Plains Archaic period sites further to the west. Recent lithic analyses have been conducted at Middle Plains Archaic period components at 48CK7, the McKean site, in northeastern Wyoming (Reher 1985), 39HN163 (Metcalf and Black 1985) and 39HN204, Lightning Spring (Keyser and Davis 1985; Keyser 1985 and Metcalf and Black 1985) located in the North Cave Hills of northwestern South Dakota, and 32BO213, Red Fox site (Keyser and Davis 1985 and Keyser 1985) in southwestern North Dakota. All of these analyses indicate that local raw materials (e.g., Tongue River Silicified Sediment and petrified wood) were preferred while exotic materials such as Knife River flint are only present in small percentages in all of the above sites (Metcalf and Black 1985:182) except 48CK7 where no Knife River flint was recognized (Reher 1985). The data presented above indicate that the apparent emphasis during the Middle Archaic on local lithic resources is not shared by the data from 39CO103. Given the present information it appears that this pattern is unique to this site or possibly this area. If other similar-aged sites within this particular area are discovered and found to contain high frequencies of Knife River flint, then one must assume that such sites share a resource procurement strategy which differs substantially from that occurring in areas further to the south or west.

The next group of sites are those designated as Plains Woodland. As noted previously (see Chapter Three), sites containing Besant projectile points are included within this period following Reeves (1983). Woodland period sites occurring in the vicinity of the project area have been assigned to the Sonota Complex (Neuman 1975) and are all dominated by Knife River flint. This pattern is duplicated at 39CO97 but not at the other two sites (see Table 18).

Site 39CO81 consists of two suspected burial mounds with a scatter of associated cultural materials. One concentration was not analyzed in the field and lack of an adequate sample may be responsible for the raw material frequencies. Another explanation could be that the site is not associated with the Sonota burial mound complex although this seems unlikely given the concentration of Sonota associated burial mounds in the area.

Site 39CO88 also differs in its dominance of Smooth Gray Tongue River Silicified Sediment. Although this source is typically found in western North and South Dakota (see Ahler 1977b) scattered outcrops, possibly related to glacial activities do occur. The location of 39CO88 on top of

Table 18. Raw material frequencies by temporal affiliation.

							Total
			Middle Plains Archaic				
LG*- 39C0103	19(.61)			1(.03)	9(.29)	2(.06)	31
			Late Prehistoric				
UG - 39C0101	1(.50)					1(.50)	2
MR - 39C085	1(.33)				1(.33)	1(.33)	3
Total	2(.40)				1(.20)	2(.40)	5
			Plains Woodland/Besant				
UG - 39C081		1.(.10)	1(.10)	2(.20)	4(.40)	2(.20)	10
MR - 39C088		5(1.00)					5
39C097	9(.90)				1(.10)		10
Total	9(.36)	6(.24)	1(.04)	2(.08)	5(.20)	2(.08)	25
			Plains Village				
UG - 39C082(C)**	9(.45)		1(.05)	2(.10)	7(.35)	1(.05)	20
MR - 39C093(M)	8(1.00)						8
MR - 39C096(C)	18(.62)	2(.07)	5(.17)	1(.03)	1(.03)	2(.07)	29
MR - 39C095(U)	6(.60)	1(.10)	1(.10)			2(.20)	10
Total	41(.61)	3(.04)	7(.10)	3(.04)	8(.12)	5(.07)	67

* LG - Lower Grand River area
UG - Upper Grand River area
MR - Missouri River area

** C - Coalescent Tradition
M - Middle Missouri Tradition
U - Unknown Plains Village

one such cobble covered ridge suggests the site resulted from use and local reduction of some of this raw material.

The Late Prehistoric period is represented by two sites with very small assemblages comprised of projectile points, bifaces and a core. This fact would suggest that they represent very temporary and specific activities, perhaps hunting related. The two assemblages also have similar patterns of lithic resource utilization. Both projectile points are made of a fine grained white chert of unknown origin. Knife River flint is also present within the assemblage.

The two projectile points are representative of those typically found during the Late Prehistoric period. However the exact affiliation is not known as similar specimens can be found in both Plains Village sites as well as those of nomadic hunter-gatherer groups (see e.g. Frison 1978) which also frequented the area. As a result, it is difficult to fit these two sites into any overall lithic resource utilization pattern since either group could be responsible for these sites.

The last group of sites are those related to Plains Village occupations (see Table 17). Three are located along the Missouri River with one situated along the upper portion of the Grand River. The presence of Plains Village ceramics separates this group of sites from the Late Prehistoric period sites discussed above. These particular sites which do not have any earthlodge features are of particular interest due to information they can provide on activities conducted outside of the village locations. This comparison is also incorporated in the last of the research questions proposed earlier in this section.

Prior to this, however, some comparisons to the other temporal categories are presented. The first observation is the dominance of Knife River flint comprising 61 percent overall (Table 16). Although some variation exists, this figure is similar to the other periods discussed above and would indicate little temporal change in the utilization of Knife River flint. Differences in the utilization of the other raw material types is more difficult to interpret due to the small number of sites. Tentatively, a wider variety of raw materials do appear to have been utilized at the two sites known to be associated with the Coalescent Tradition. This pattern agrees with Ahler's (1977b:132) original analysis in that the two Extended Coalescent villages exploited a variety of raw material types while the Extended Middle Missouri villages were dominated by Knife River flint.

The answer to the last question confirms that the lithic resource utilization patterns for the non-earthlodge village sites are consistent with the patterns Ahler (1977b) found for his Coalescent and Middle Missouri Tradition sites. This pattern would suggest that the raw materials (i.e. formalized tools, cores, etc.) present within the villages were taken to off-village locales where they were used, rather than relying solely on locally available raw materials. As such the villages basically functioned as raw material store houses which in effect "evened out" the discontinuity of the geologic sources within the region (cf. Binford 1979:258). As a consequence the raw materials present within the villages to a certain extent become duplicated at the outlying special activity sites. Given this situation one should be able to define cultural

affiliation based on raw material frequencies when diagnostic artifacts such as ceramics are present but are unable to be assigned to either of the Plains Village traditions. It should be noted, however, that the previous conclusions are based only on a sample of three sites and at this point should only be considered as a working hypothesis requiring additional testing.

The previous discussions hopefully have shown the usefulness of investigating the prehistoric utilization of lithic resources. However, the tentativeness of the conclusions are somewhat biased by differential data recording techniques. Future studies of these problems require more rigorous data collection techniques, such as complete analysis of assemblages or statistically valid sampling of large lithic assemblages. More replicable studies would necessitate large surface collections, a measure which however, is discouraged by the Corps of Engineers and beyond the scope of Class III inventories.

CHAPTER NINE
GEOARCHEOLOGICAL INVESTIGATIONS

Michael McFaul

Introduction

In 1985, LaRamie Soils Service conducted a geoarcheological survey along the right bank of Lake Oahe from Indian Memorial Island northward to the North Dakota - South Dakota State line (McFaul 1985b, 1986). This investigation attempted to assess the archeologic potential of this topography by grouping similar landforms (geomorphology) and soils (pedology) according to their history, soil-sediment characteristics and relative ages.

The scale of projects like this have been troublesome for geoarcheologists (Artz 1985) due to their large size and the profession's preoccupation with mitigation and testing. This investigation addressed the scale problem by employing a methodology similar to a soil/resource inventory (Soil Survey Staff 1951). Ground truth validation was provided by soil-sediment descriptions (Soil Survey Staff 1951, 1975), terrain analysis (Way 1973; Cain and Beatty 1968), geomorphic interpretations (Birkeland 1984), physiographic models (Crandell 1953; Flint 1955; Clayton et al. 1976) and thermoluminescence dating (Aitken 1985). A paleoenvironmental reconstruction (McFaul et al. 1986, McFaul 1986) was also developed to trace archeological potential of the landform and soil associations through time. It is hoped this methodology will prove valuable to future investigations and permit the Corps of Engineers to accurately assess the archeologic potential of their Missouri River lands.

Methodology

The survey employed a graduated five step investigative process consisting of:

1) A literature review,

2) Hypotheses development,

3) Field hypothesis testing,

4) Model construction, and

5) Geoarcheologic assessment.

Literature Review:

This literature review was designed to promote an understanding of the regional physiography (Flint 1955; Crandell 1953; South Dakota Geological

Survey [SDGS] 1950, 1951a, 1951b and 1952) and aid in determining specific investigative strategies that mesh with other Missouri River georacheologic studies (Artz 1985; McFaul 1985a, 1986; Coogan 1977, 1983; Clayton et al. 1976; Moran et al. 1976; Ahler et al. 1974; Coogan and Irving 1959). The related works of Miller et al. (1985) on the lower Mississippi River, Gardener and Donahue (1985) on the Little Platte River, and Bettis and Benn (1984) and Bettis and Hoyer (1986) on the Des Moines River were also helpful. The glacial-sediment-soil models of Bettis et al. (1986), Clayton and Moran (1982), Ruhe (1969, 1976), Clayton et al. (1976), and Moran et al. (1976) together with an interpretation of Pinsof's (1985) South Dakota vertebrate localities proved valuable in understanding the physiographic evolution of the study area.

The physiography of the study area has developed upon the easily erodable Cretaceous Pierre Shales (Flint 1955). These shales have been extensively modified by fluvial, glaciofluvial and degradational processes (McFaul 1986; Flint 1955; Crandell 1953; Warren 1952; Warren 1869: 311) along with glacial processes (Moran et al. 1976; SDGS 1950, 1951a, 1951b, 1952) and Late Wisconsin-Holocene climatic periods of hillslope instability, sedimentation and pedogenesis (Clayton et al. 1976). The Pleistocene Epoch glacial activity created the Missouri River by diverting the existing eastwardly trending streams southward (Flint 1955). The time of the diversion is unclear. Warren (1952) and Flint (1955) believed diversion occurred during Illinoian time. Flint (1971) reconsidered, possibly due to the influence of his student Crandell (1953) and suggested a Wisconsin glacial date for diversion. More recent investigators (Coogan and Irving 1959; McFaul 1985a, 1986) have attempted to date diversion based upon Missouri River terrace chronologies. Coogan and Irving (1959) felt diversion was pre-Cary (presently considered a late Wisconsin stadial, Nilsson 1983) while McFaul (1985a) operating in approximately the same area inferred diversion occurred in the early Wisconsin.

The glacial diversion of the eastwardly trending drainages to the Missouri River and changes in the Missouri's flow regime were responsible for the creation of four glaciofluvial and/or fluvial terraces (SDGS 1950, 1951a, 1951b, 1952; Crandell 1953; McFaul 1985a, 1986) in the study area. These terraces have been designated "Mt" for Missouri terrace and ordered by their height above the Missouri River (Coogan and Irving 1959). Three of the terraces are accumulation surfaces mantled with gravels and loess sediments. The other is an erosional wave cut terrace (McFaul 1985a, 1986) similar in elevation to the Lake Arikaree surface in the Blue Blanket area (SDGS 1952) and in description to the "Giddings Flat" surface (Artz 1985).

Terraced landforms, because of their gentle gradients, are excellent repositories for eolian sediments (Clayton et al. 1976). Clayton et al. (1976) have identified a Late Wisconsin-Holocene unit consisting of alluvial sediments capped by a silt loess sequence along the Missouri River in North Dakota. This sequence is named the Oahe Formation (Clayton et al. 1976) and consists of four members. They are designated the Mallard Island, Aggie Brown, Pick City, and Riverdale members. The Mallard Island is a very pale brown (10YR 7/3 d) Late Wisconsin glacial melt water deposit dating to 11,000 B.C. The Aggie Brown loess is divided into two submembers, a light brown (7.5 YR 6/4 d) 11,000 to 8,000 B.C. soil B horizon overlain by a gray-very dark gray (10 YR 4/1, 10 YR 3/1) soil A horizon dating 8,000 to 6,500 years B.C. This distinct buried paleosol,

named the Leonard Paleosol (Bickley, 1972), is mantled by the light gray (2.5 Y 7/2 d) carbonate rich Pick City member which dates 6,500 to 3,000 years B.C. The Riverdale is the youngest member dating 3,000 years B.C. to present and has three submembers. The lower and upper submembers are grayish brown (10 YR 5/2 d) while the middle is a brownish gray (10 YR 6/2 d). The Oahe members are "easily recognizable in the field" (Clayton et al. 1976:3) by their color. The composition and colors of the Oahe Formation are believed to correlate with Late-Wisconsin and Holocene climatic fluctuations (Clayton et al. 1976). The darker horizons represent more moist soil forming climatic periods when the hillslopes were stabilized by vegetation and rivers were downcutting (Clayton et al. 1976: 8). The lighter colored members represent dryer climatic periods where the hillslopes were more sparsely vegetated and subject to erosion. During dry periods increased amounts of sediment were available for eolian deposition on the gentle slopes and alluviation occurred in the valley bottoms (Clayton et al. 1976:8-9).

Methodology:

The literature review implied an assessment of the geoarcheologic potential of the landforms in the study area could be accomplished by grouping the landforms into associations based upon their origin, depositional history and soil development. These landform-soil associations would then be analyzed in terms of their geoarcheologic potential. Conceptual approaches similar to this are finding favor with geoarcheologists (Bettis and Benn 1985; McFaul 1985; and Gardner and Donahue 1985), however they have been used for years in soil/resource surveys (Soil Survey Staff 1951) and terrain analyses (Way 1973).

The landforms in the study area were grouped into seven mapping units based upon similarities in their physiographies, elevations, and soil-sediment profiles. Initially the mapping units were delineated on Soil Conservation Service (SCS 1983) and Corps of Engineers (1981) air photos. Subsequently these delineations were transferred to U. S. Geological Survey 7.5 minute 20 foot interval topographic maps and field checked with the closer contoured, 10 foot interval, Missouri River Basin (U.S. Army Corps of Engineers [USACE] 1947) maps.

Following the delineation of the seven mapping units an assessment of each unit's geomorphic history, soil-sediment characteristics, relative age, and thereby its potential to contain cultural materials was made. To validate these assessments a pedestrian survey was conducted along cutbank exposures, numerous vehicular traverses were made and representative soil-sediment columns were described. Soil-sediment cores were also collected in the hope that radiocarbon or thermoluminescence dating techniques could provide time control for man-land modelling.

Modelling:

Man-land modelling was built upon the interpretations of Wisconsin-Holocene events (Crandell 1953; Flint 1955; Ruhe 1969; Clayton et al. 1976; Moran et al. 1976; Clayton and Moran 1982; Bettis et al. 1986; Bettis and Hoyer 1986; McFaul 1986), an understanding of fluvial processes (Schumm

1977; Cain and Beatty 1968) and a familiarity with the Missouri River terrace sequence (Crandell 1953; Coogan and Irving 1959; McFaul 1985).

This model also attempted to address the following regional geomorphic-geoarcheologic problems:

1) Creation of the Missouri River trench (Flint 1955; Todd 1923),

2) Identification of a Wisconsin-Holocene loess-soil sequence in the region (McFaul 1985; Clayton et al. 1976; Ruhe 1976),

3) Delineation of glaciated topography west of the Missouri River and estimation of its age (Ruhe 1969; Moran et al. 1976),

4) Correlation the terrace sequence with those downstream (Artz 1985; McFaul 1985; Coogan 1983; Coogan and Irving 1959) and

5) Refining of the Oahe formation sequence (Clayton et al. 1976).

Landform Associations

Seven landform associations (Figure 86) are present along the right bank of the Missouri River in South Dakota, north of Indian Memorial Island to the North Dakota-South Dakota state line. These associations include a series of erosional buttes, a deflated erosion surface, the dissected bluff terrain known as the "Missouri Breaks," three fluvial accumulation terraces and one erosional cut terrace. The location and distribution of these associations are depicted in Appendix B.

The highest landform association, at approximately 695m (2280 ft), is a linear series of north-northeast dipping, south-southwest to north-northeast trending erosional buttes. The buttes are capped by the Miocene-Pliocene Bijou Formation sandstones (SDGS 1950, 1951) or the Cretaceous Fox Hills Formation sandstones (Flint 1955:25) which are visible at the summit of Rattlesnake Butte near the southern portion of the study area. Heil and Kempton (personal communication 1985), Soil Conservation Service mappers of Corson County, report the northern buttes are mantled with loess.

East of the buttes is a broad deflated erosion surface, 613 to 634m (2011 to 2080 ft) in elevation, littered with granitic boulder erratics and pock-marked with enclosed depressions. The morphology of the erosion surface is anomalous to the Missouri River trench. Rather than dip toward the trench, the deflated surface dips away from the trench and forms a concave depression at base of the butte topography. Flint (1955:141) states that this anomalous relationship is indicative of very recent trench creation since the upland would grade towards the trench with time. This decrease in elevation away from the trench also suggests the surface predates formation of the Missouri River. Moran et al. (1976) have described similar landforms in North Dakota, which are correlative with the Early Wisconsin or older (Clayton & Moran 1982) Napoleon Glaciation. Ruhe (1969; personal communication 1985) states this deflated erosion surface is a western counterpart of his middle Wisconsin "Iowan" surface.

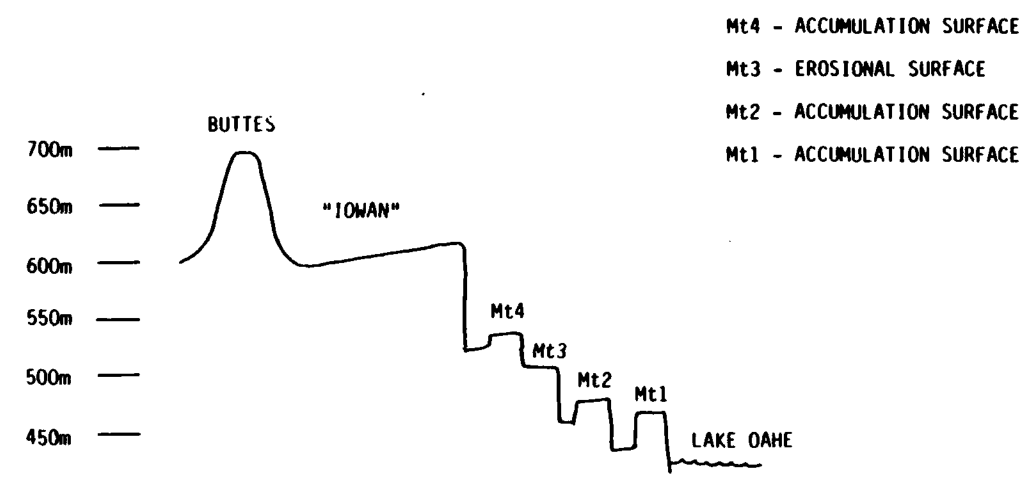

Figure 86. Generalized profile of the Missouri River landform associations.

The soils of the erosion surface are generally developed upon the Cretaceous Pierre Shale and are vertosolic (self churning). The South Dakota Geological Survey (1952) has mapped acculations of Quaternary loess on this surface. This investigation did not witness these loess accumulations within the project area; however, when present they may provide a datable context for archeologists similar to the Oahe Formation (Clayton et al. 1976) or the three different loess deposits in the Loess Hills of Iowa (Bettis et al. 1986). Correlation of the loessial unit, if present, may prove useful in determining when the Missouri River was created.

From the eastern boundary of the erosion surface the topography descends rapidly from 634 to 488m (2080 to 1601 ft) at Lake Oahe. This steep dissected bluff terrain forms a landform association known locally as the "Missouri Breaks". Numerous headwardly eroding ephemeral streams cut into the Pierre Shale bedrock exposed in the "Breaks" to form steep-sided micro-ridge and valley terrain. Soil development on the slopes is minimal because "erosion is so rapid that it outstrips the rate of development of soil and...inhibits the formation of a cover soil and [the growth of] vegetation" (Flint 1955: 24).

Geogenic (Buol et al. 1980) or cumulic soils are present in the "Breaks" where alluvial, colluvial and eolian sediments accumulate. An example of a geogenic profile can be seen in a depression on the western edge of Indian Memorial Island. This cumulic profile is a layer-cake stack of aeolian and colluvial sediments overlying the Pierre shales. These accumulations in the micro-valleys may correspond with climatic periods of hillslope instability (Clayton et al. 1976; Bettis and Thompson 1982; Bettis et al. 1986) and permit relative age dating of any cultural components present. Outside the cumulic settings the soils are developed on the Pierre Shale and appear to be a member of the Opal soil series. This series is a very fine, montmorillonitic, Mesic Vertic Haplustoll (Schumacher and Heil 1979).

Associated with the "Breaks" and in the Grand River and Hunkpapa drainages are the four fluvial terraces. The soil-sediment relationships differ on each terrace unit and reflect the environmental conditions responsible for their construction. The highest terrace or Mt4 is approximately 85m (279 ft) below the deflation surface and 79m (259 ft) above the 1947 Missouri River floodplain (USACE 1947). Descending in elevation, the other terraces are approximately 46, 37, and 21m (151, 121, and 69 ft) above the Missouri River's 1947 floodplain (USACE 1947).

Terrace nomenclature developed by Coogan and Irving (1959) for the Missouri River designated the surfaces "Mt" for Missouri terrace and ordered them by their ascending relationship above the 1947 river elevation (USACE 1947). One significant variation from Coogan and Irving's (1959) ordering nomenclature is utilized in this report. The variation is based on a more traditional interpretation of terrace formation which states floodplains "can only be transformed into a terrace by some tectonic, climatic, or man-induced change which alters the regimen of the river, causing it to entrench itself below its established bed and associated floodplain" (Wolman and Leopold 1957:16). In light of this definition the Mt0 and Mt1 terraces (see Table 19) of Coogan (1983) and Artz (1985) are

Table 19 Stream terrace elevations and possible correlations with other Missouri River terrace sequences downstream. *terrace designation, **elevation (meters) above sea level, ***terrace elevation (meters) above the Missouri River

McFaul (this paper)				McFaul (1985)				Artz (1985)				Coogan & Irving (1959)		
*	**	***		*	**	***		*	**	***		*	**	***
Mt4	549	79												
Mt3	518	46						Mt4	533-573	100-139				
Mt2	506	37	- ? -	Mt2		30-39	- - ? -	Mt3	472-500	39- 66	-?-	Mt2		24-31
Mt1	491	21	- ? -	Mt1		6-12	- - ? -	Mt2	442-454	8- 20	-?-	Mt1		10-14
								Mt1	436-440	2- 7		Mt0		3- 5
								Mt0	436-438	2- 4				

thought to be the modern floodplain and a floodchannel step (Howard 1959). Designating these surfaces as terraces creates the false impression entrenchment has occurred. This erroneous assumption can play havoc with site probability and relative age determinations based upon theories of fluvial response to climatic change (Schumm 1977).

The Mt4, at 549m (1802 ft) in elevation and 79m (259 ft) above the former floodplain, is the highest terrace identified in the study area. Its soil-sediment column (Figure 87), hastily described in a very active gravel mine, consists of an unknown depth of non-weathered possibly "Western" (Crandell 1953; Pinsof 1985) bedded fluvial sands and gravels overlain by approximately two meters of loose yellowish-red (5YR 5/8 d) oxidized or weathered laminated sands and gravels. These gravels are mantled by 1.6m (5.25 ft) of dark gray silts, 0.4m (1.3 ft) of light brown silts, and 0.4m (1.3 ft) of dark brown surface silts. Soil development is weak, lacking observable carbonate accumulations, structural development or accumulations of translocated clay. The relationship between soil development and terrace height is curious. In general alluvial terraces increase in age with increases in elevation above the modern floodplain. This hypothesis implies the Mt4 is the oldest of the four terraces and should have the most well-developed soil. The comparative weakness of the Mt4 soil does not support this hypothesis suggesting the sediments the soil has developed on are younger than the weathered gravels.

The Mt3, approximately 33m (108 ft) below the Mt4 at 518m (1699 ft) in elevation, is the most areally extensive terrace. Its surface is void of glaciofluvial gravels and its soils are developed directly upon the Cretaceous Pierre shales (Figure 88). Mt3 soils are similar in appearance to the Opal-Sansarc-Promise association (Schumacher and Heil 1979) described on a similar appearing surface in Campbell County east of the river. The only occurrence of aeolian sediments observed on the Mt3 is a lenticular loess "dune" along the southwestern margin of the Oak Creek drainage. Some glacial erratics are found on this terrace, however, they are less common in comparison to the numbers seen on the deflated erosion surface. Thinly laminated sediments overlying the shales area are visible in stream and road cuts in the Hunkpapa and Oak Creek drainages. The lack of alluvial gravels mantling the Pierre shale suggests that the Mt3 surface is an erosional cut terrace created by the wave action of an impounded Missouri River (McFaul 1986). Support for this hypothesis appears in the lake sediments mapped in the study area and in the Blue Blanket area to the southeast (South Dakota Geological Survey 1950; 1951; 1952).

The Mt2 mapping units in the Grand River and Oak Creek drainages occur in a step-like relationship approximately 12m (39 ft) below the Mt3. Examination of a Mt2 profile at an elevation of 506m (1660 ft) in the Grand River drainage west of the northern end of the Singing Bridge reveals the approximately five meters (16 ft) of loose lightly weathered yellowish-red (5YR 5/8 d) gravels. The gravels, which are similar in appearance to the upper two meters (6.6 ft) of the Mt4 gravels, overlie the Pierre Shale. These gravels are conformably mantled by 2.25m (7.4 ft) of light brownish gray and grayish brown silts. Soil-sediment characteristics (Figure 89) indicate at least two major silt units are present. The lower is distinguished by a buried soil horizon having yellow hues and an indurated, 2-5mm, granular structure with slickened sides. A sample of this horizon

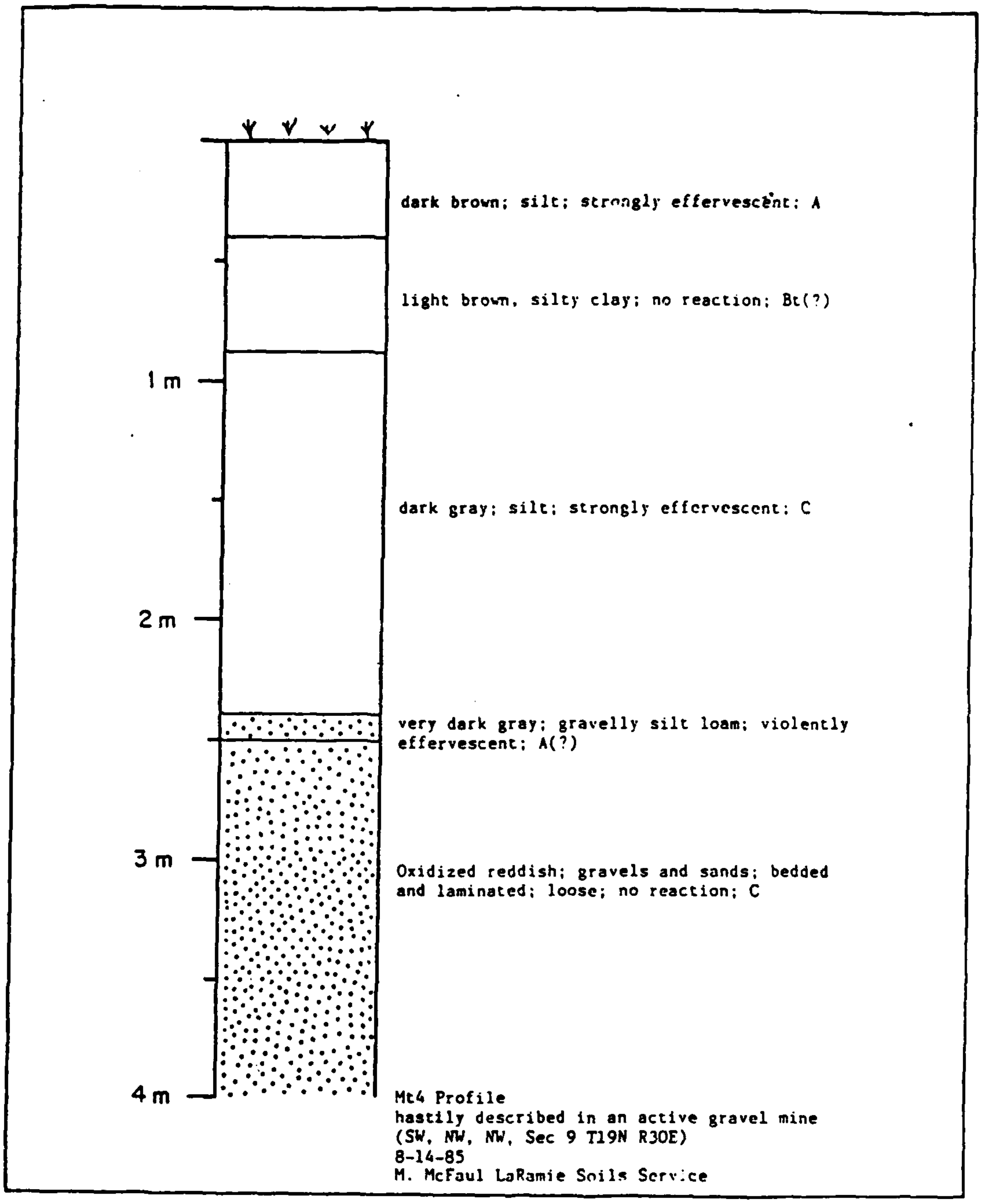

Figure 87. Mt4 representative profile.

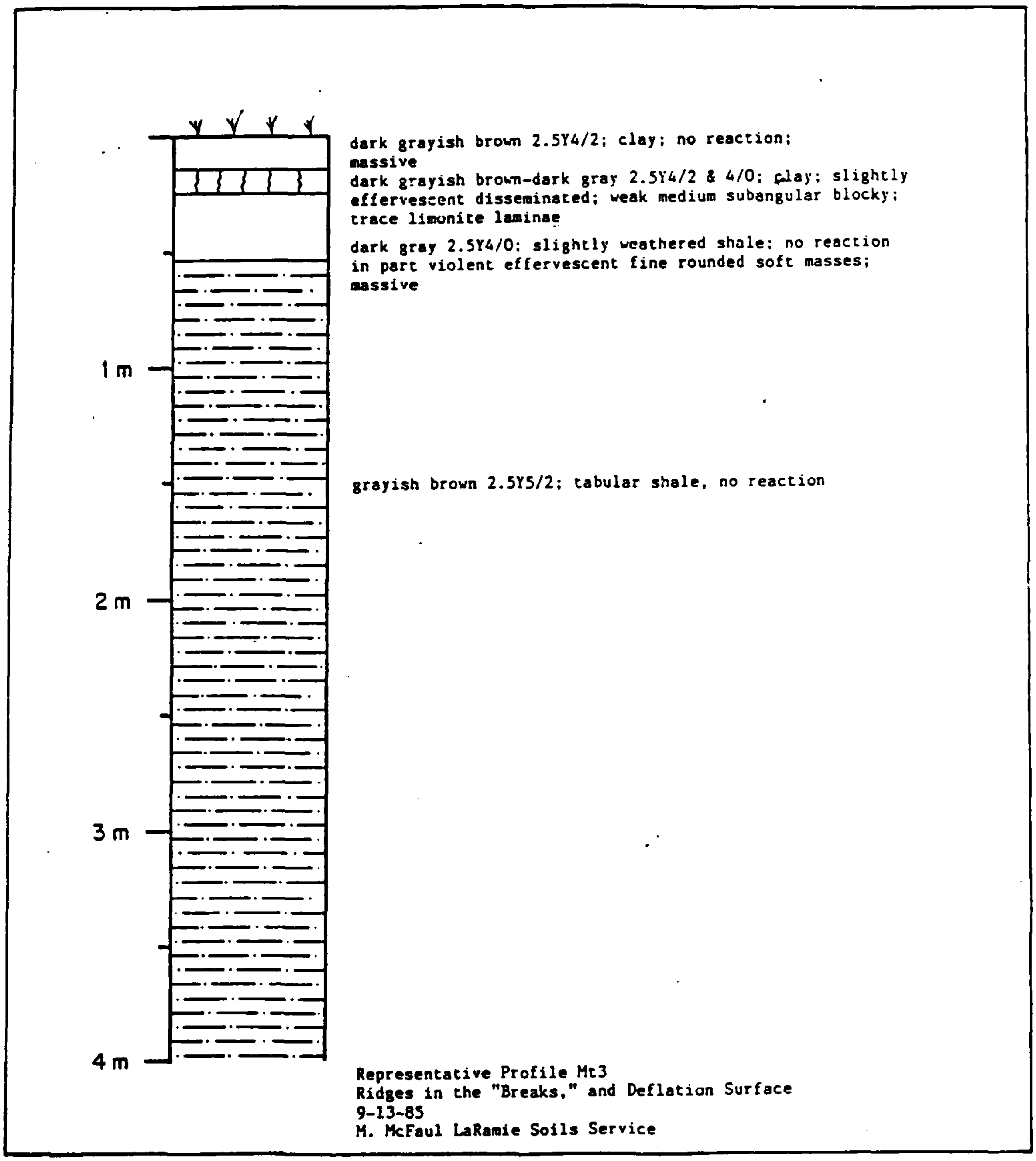

Figure 88. Mt3 representative profile.

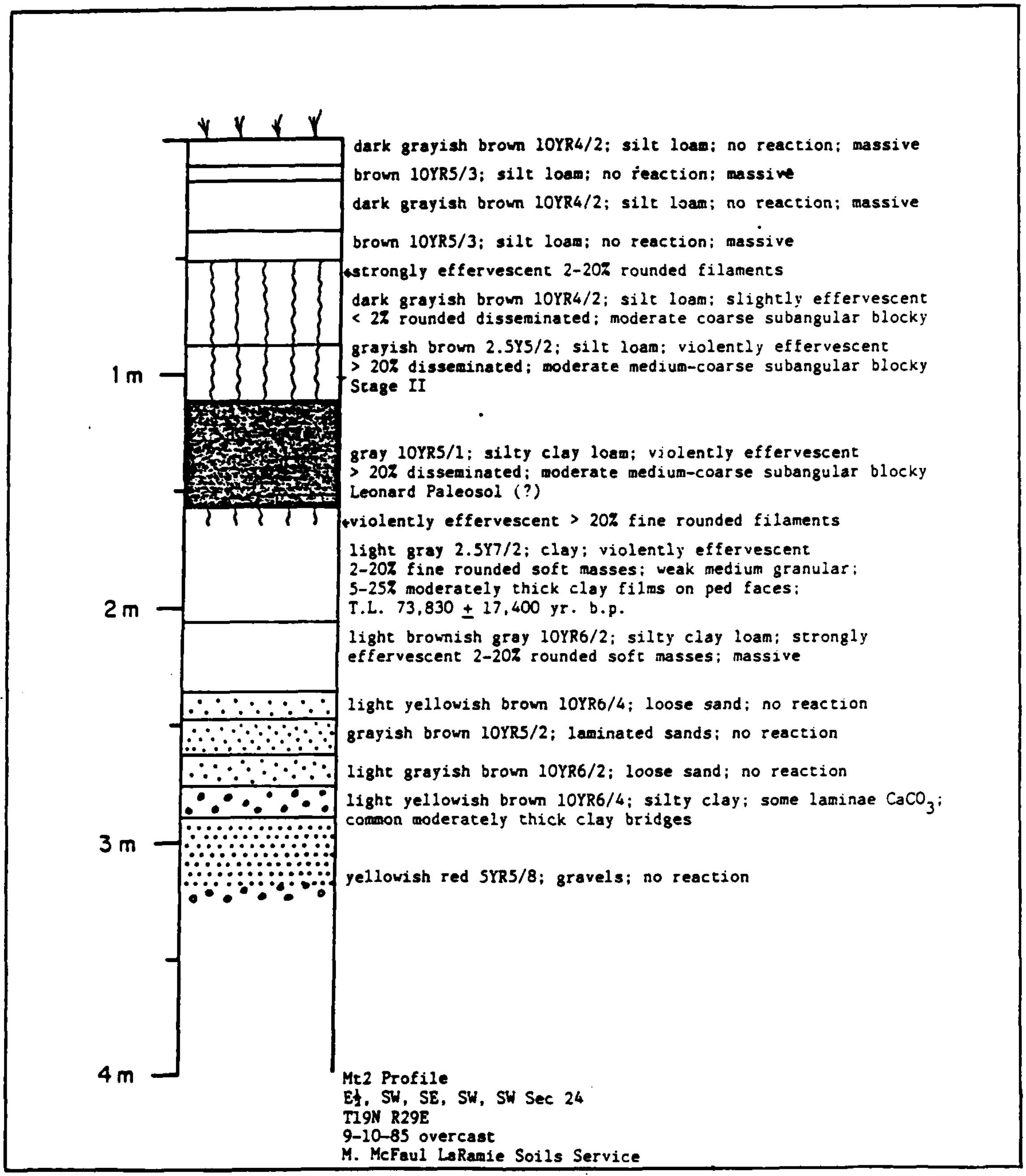

Figure 89. Mt2 representative profile.

collected in a light free environment, thermolumescence dated 73,830 ± 17,400 years: 71,880 B.C. (Alpha 2815).

The thermoluminescence date implies the soil horizon is early Wisconsin in age. A complete review of thermoluminescence dating procedures with the dating laboratory (J. Stipp, personal communication 1986) and the theory of thermoluminescence (Aitken 1985) increases confidence in the 71,880 B.C. date. However, this review also pointed out that water protects sediments from the loss of datable particles due to exposure to the sun. It is therefore possible that sediments of an older age may be redeposited on a younger landform by water without a loss of their datable particles due to exposure to the sun. Thus a younger landform mantled with alluvial sediments may date older than it actually is.

This is believed to be the case with the lower Mt2 loess unit. Similar explanations for older sediments appearing within younger strata are familiar to thermoluminescence scientists (D.G. Hood, Senior Chronologist, Alpha Analytic, personal communication, 1986). This redeposition hypothesis also helps explain why the dated horizon has a pedogenically immature granular soil structure (Birkeland 1984:15-17). The position of the dated horizon (Figure 89) within the soil sediment column approximately correlates with the greater than 13,000 year old (Clayton et al. 1976) Mallard Island Member of the Oahe Formation. Clayton et al. (1976:10) use calcite/dolomite ratios to show "the Mallard Island Member [is a floodplain accumulation] deposited while the Missouri River still carried glacial meltwater...." This investigation considers the dated horizon to be time transgressive consisting of early Wisconsin sediments redeposited by glacial meltwaters before 13,000 years B.P. (Clayton et al. 1976) on the Mt2.

Future investigators are urged to map locales and carefully describe (e.g., Soil Survey Staff 1951; Birkeland 1984) similar Mt2 soil-sediment relationships and help establish the validity of this redeposition hypothesis. The dated sediments are identifiable in the field by their hue and the moderately thick pressure films on the granular ped faces.

The dated sediments are capped by a loess whose basal sediments contain a buried soil A horizon. Stage II carbonate accumulations are present above the A horizon and superposed into it. Gile et al. (1966:348) believe Stage II carbonates date to greater than 3,000 years B.C. The position of the carbonates and their suggested age implies the buried soil A horizon correlates with the 8,000 to 6,500 years B.C. Leonard Paleosol. It also suggests the carbonates correlate with the 6,500 to 2,500 year B.C. Pick City Member of the Oahe Formation. The upper 45cm of this loess unit is characterized by alternating A and Bw soil horizons (Soil Survey Staff 1975). This horizonation is very similar in appearance to the post-Altithermal to modern soil sediment sequence of the Oahe Formation's Riverdale Member (Clayton et al. 1976).

The Mt1 at 491m (1610 ft) is the lowest of the seven soil-landform associations mapped in the study area. Its relationship to the Missouri River floodplain and its soil-sediment characteristics suggest correlation with the Walth Bay (Ahler et al. 1974), Travis 2 (Ahler et al. 1977) and Artz's (1985) Mt2 surface. A representative Mt1 profile is accessable on the eastern margin of Indian Memorial Island (Figure 90).

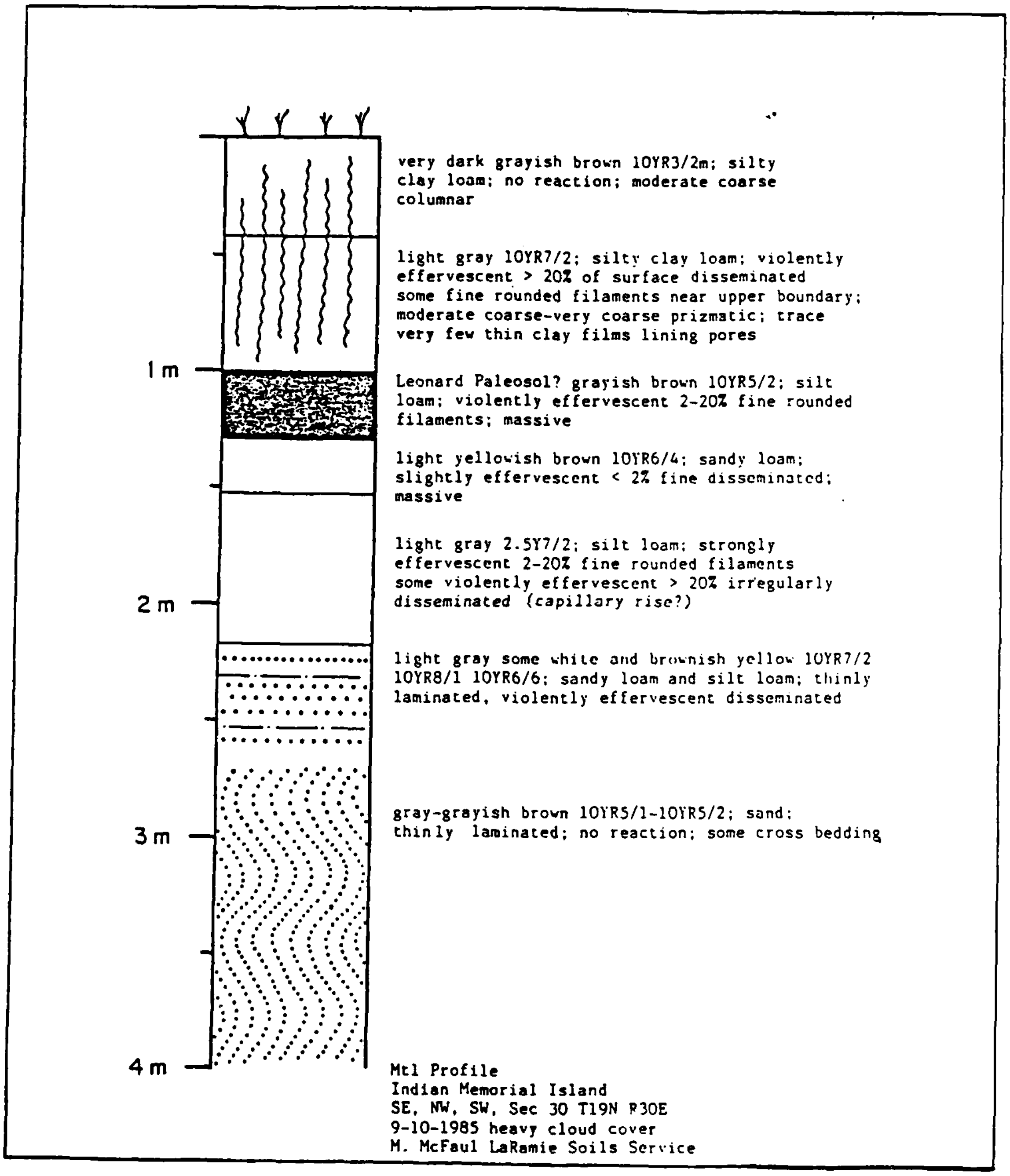

Figure 90. Mtl representative profile.

At Indian Memorial Island the basal three meters of the profile above the lake level are clean, non-weathered (latest Wisconsin), laminated, loose, glaciofluvial sands and gravels interlensed with at least one reworked lens of tabular shales. These gravels are overlain by 2.3m (7.5 ft) of progressively finer textured sands and silt-loams. Gradual changes in sediment textures similar to the Mt2 gravel/loess boundary suggest a conformable or uninterrupted deposition. Approximately one meter below the surface of the Indian Memorial Island profile is a grayish brown (10YR 5/2 d) buried soil A horizon. Dark soil horizons suggest a moist mollisolic soil forming environment (Birkeland 1984). A sample of this horizon was submitted for radiocarbon dating, but it lacked sufficient amounts of carbon for a reliable date (Beta Analytic, personal communication 1986). Lacking dating control, the morphology of buried soil horizon, its color and position imply correlation with the Leonard Paleosol.

This hypothesis is also supported by the presence of carbonate accumulations above the paleosol. Disseminated carbonates and some thin clay skins are present in the Indian Memorial Island profile. The presence of carbonates in finer textured sediments suggests replacement of a moist (Leonard?) soil forming climatic regime by a dryer environment (Birkeland 1984:312-316). The modern soil of the Mt1 column shows pedogenic development having columnar structure, effervescence below the epipedon and a dark Mollic appearing soil A horizon. The Mt1 soil-sediment sequence appears identical to that pictured and described for the Holocene members of the Oahe Formation at its Riverdale, North Dakota, type locality (Clayton et al. 1976:4).

Geoarcheologic Assessment

This geoarcheologic assessment is based upon the assumption that an Earth Scientist or "Geo"-archeologist can evaluate the archeological potential of soils, sediments, and landforms bordering the right bank of Lake Oahe. Strategies employed in developing the geoarcheologic assessment include a terrain analysis, descriptions of soils and sediments, thermoluminescence dating and the identification of the late Wisconsin-Holocene Oahe Formation. The geoarcheologic importance of the Oahe Formation to this study cannot be overstated. "In the bluffs along the Missouri River . . . the Oahe Formation can be subdivided, on the basis of color, into four . . . easily recognizable . . . members" (Clayton et al. 1976:3).

Simply put, identification of the Oahe Formation provides the field archeologist with a tool to assess the relative ages and extents of the sediments and soils associated with individual site locales. Due to the formation's archeologic value, its presence or absence forms a central theme in the discussion of the individual landform-soil associations recognized within the U.S. Army Corps of Engineers' property. It is hoped these assessments will promote an understanding of the Oahe Formation and its importance to project area's geoarcheologic potential.

Deflated Erosion Surface:

This highest landform-soil association occupies only a small segment of the project area. It is a denuded landform laid bare of all but the most resistant sediments. The soils are developed upon the Pierre Shale and littered within granitic erratics. The association is considered to be the oldest within the boundaries of the study area. Deflation of this landform possibly began following the pre-early Wisconsin Dunn (Clayton and Moran 1982) and/or the Early Wisconsin or older Napoleon Glaciations (Moran et al. 1976) and continued through the Mid-Wisconsin "Iowan" interglacial (Ruhe 1969; personal communication 1985).

Degradational processes act to limit this Pleistocene unit's geoarcheologic potential by precluding the accumulation of sediments which can bury and separate cultural components. The vertisolic or self-churning capacity of the soils developed on the Pierre Shale also limits their geoarcheologic potential by mixing cultural components.

The soil-sediment context of the archeological materials found within this unit should be examined to determine if they have been disturbed by self-churning (pedoturbation). An examination of the site's microphysiography is also suggested. The association contains numerous enclosed depressions that can offer an ideal setting for the burial of artifacts possibly in a datable sediment sequence (see Clayton et al. 1976). Although not detected by this investigation, segments of this unit may be mantled with eolian sediments (SDGS 1952). These sediments offer a context suitable for preserving cultural materials in situ. A soil-sediment description can be used to determine if eolian sediments are present and possibly date the artifacts by comparing them with the Missouri River loess sequences (Clayton et al. 1976; Bettis et al. 1986).

Missouri Breaks:

This steep incised bluff morphology is developed upon the bedrock Pierre Shale. The shales are easily eroded and are said "to flow when wet and fly when dry" (Flint 1955:24). Due to their well documented (see Artz 1985) lack of stability, the steep slopes of the "Breaks" are considered to offer a decreased potential for the in situ preservation of cultural materials compared to its numerous draws and slump block valleys. Sediment accumulations in the draws and valleys offer an increased potential for preserving cultural materials. Periods of sedimentation in the breaks are thought to coincide with climatic induced periods of hillslope instability (Clayton et al. 1976). Future investigations should consider developing a dated soil-sediment chronology for these locales similar to the DeForest Formation in Iowa (Daniels et al. 1963; Bettis and Hoyeer 1986) and to refine Clayton et al's. (1976:8-9) hillslope model.

Other variables that should be considered when cultural materials are encountered in accumulation locales are the method of sediment transport, the landforms stability through time and the composition of the soil-sediment matrix. For example alluvial and colluvial accumulations may contain redeposited artifacts of differing age. Another consideration is the landforms overall stability through time. Much of the "Breaks" is subject to repeated catastrophic slumping and sliding which destroys site

contexts. Finally the soil-sediment matrix may contain accumulations of shrink and swell clays that create a self-churning action in the soil (pedoturbation). Fabric orientations (Buol et al. 1980) can be examined for evidence of pedoturbation. As a result of these variables the "Breaks" are considered to have a lower potential for containing undisturbed cultural deposits.

Mt4:

The height of the Mt4 above the Missouri River suggests it is the oldest of the four fluvial surfaces in the study area. It is a gravel-armored surface mantled with accumulations of alluvial or eolian silts. The soil developed on the silts is weakly developed (Birkeland 1984) and no apparent correlation with the Oahe Formation sequence was noted. This lack of soil development hints the silts are Holocene Epoch eolian sediments; however this can only be considered a "best guess" and more information is needed. Nonetheless the eolian sediments provide a fine environmental setting for the burial and separation of cultural materials in situ. Future investigations are asked to describe the Mt4 soil-sediment relationship in a placid locale, date the organics in the upper and lower horizons and build a chronology to establish the true archeological potential for this unit. At present its archeological potential is promising but unknown.

Mt3:

The Mt3 is a strath terrace cut onto the Pierre Shale. Except for a few locales, the soils are developed directly on the shales and lack accumulations of Oahe Formation loess. Lacking loess accumulations the Mt3 soils do not provide the soil-sediment context needed to separate cultural affiliations. Soils developed on the Pierre Shale are also vertisolic (self churning) and the context of any cultural components should be examined for evidence of natural disturbance (Buol et al. 1980).

Exceptions to this concept are the loess dune found on the southern rim of the Oak Creek drainage, the laminated lake bed sediments (SDGS 1951), and the laminated (overbank ?) sediments in the Hunkpapa drainage north of Kenel. Clayton et al. (1976), Bettis et al. (1986) and the results of this investigation show that Oahe loess accumulations increase downwind from the north and northwest. Mt3 locales south or southwest of loess source areas therefore have an increased potential to preserve cultural materials in situ. The date of these loess sediments is not known, but carbonate accumulations in the loess dune south of Oak Creek suggest they are Pick City (6,500 to 3,000 years B.C.) (Clayton et al. 1976:11) or younger. In general the geoarcheologic potential of the Mt3 is low due to the vertisolic (self churning) nature of its soils, but isolated occurrences of loess accumulations increase its potential. These loess accumulations have a higher potential and possibly contain cultural materials dating from 6,500 years B.C.

Mt2:

The Mt2 surface is a fill terrace (McFaul 1986) developed on the Pierre shale bedrock. Its fill consists of approximately four meters (13.1 ft) of weathered glaciofluvial sediments similar to those described on the Mt4 and approximately two and one half meters (8.2 ft) of eolian loess. Field descriptions (McFaul 1985b) suggest a full Oahe Formation sequence nearly identical to the Oahe type locality at Riverdale, North Dakota (Clayton et al. 1976:4) is present.

The geoarchaeological significance of this unit is very high. The presence of a complete Oahe Formation indicates the Mt2 has provided a stable surface for occupation since the Missouri abandoned this paleofloodplain and began downcutting to the Mtl floodplain. The Oahe Formation also provides a recognizable soil-sediment sequence helpful in dating cultural materials and developing a paleoclimatic/occupation model to 11,000 years B.C. (Clayton et al. 1976:11).

Delineation of the Oahe may help answer the commonly asked question, "Where are the Early Paleoindian artifacts?" Moran et al. (1976) divide the 11,000 to 6,500 year B.C. sediments of the Aggie Brown Member of the Oahe Formation into two units. The lower consists of fine grained bright colored sediments dating 11,000 to 8,000 years B.C. and the upper consists of organic stained sediments dating 8,000 to 6,500 years B.C. Only this darker upper unit, known as the Leonard Paleosol, is found directly above Late Paleoindian materials and glaciofluvial gravels on the Mtl surface at Walth Bay (Ahler et al. 1974) and Travis 2 (Ahler et al. 1977). The absence of the lower Aggie Brown member on the Mtl indicates the Missouri had abandoned its Mt2 floodplain at the end of the Mallard Island sequence (ca. greater than 11,000 years B.C.) and did not create the Mtl until the beginning of the upper Aggie Brown (ca. less than 8,000 years B.C.). Therefore river downcutting may have obliterated much of the Early PaleoIndian aged landscape. A more detailed examination of both left and right bank sediments in light of fluvial processes (e.g., Schumm 1977; Cain and Beatty 1968) must be done to fully establish the validity of this hypothesis.

Mtl:

The Mtl is a fill or accumulation terrace mantled with two to two and one-half meters (6.6 to 8.2 ft) of eolian sediments. Work at Travis 2 (Ahler et al. 1977) and Walth Bay (Ahler et al. 1974) indicates the archeological potential of this terrace is high and dates to approximately 7,000 years B.C. Soil-sediment relations suggest the upper Aggie Brown, Pick City and Riverdale members of the Oahe Formation are present. These eolian Oahe sediments provide an ideal matrix for preserving cultural materials and site integrities. The individual members also provide a rapid method of relative age dating cultural materials in the field.

Archeological Sites and Landform Associations

In order to provide an estimate of the geoarcheological potential of the various landform associations, the 1985 inventory results were compiled

by landform associations which are provided in Table 20. From this table, it is evident that only four landform associations contain sites which is essentially due to the fact that the other landforms are outside the project area. It should also be noted that the ratio of sites to each landform in Table 20 basically reflects the amount of area encompassed by each landform (see Appendix B) within the project area. Thus, the fact that Mt3 contains only one site is due to the small amount of Mt3 surface within the project area. A comparison of actual site and landform acreages may be a worthwhile investigation for future studies.

A comparison of the types of sites occurring within each of the landforms does show some general correspondences to the geoarcheological potentials described above. The Mt1 and Mt2 surfaces contain approximately the same number of previously recorded sites (large prehistoric/historic occupations), new sites and isolated finds. Apparently these two relatively flat, well-preserved, loess covered surfaces were highly favored for both prehistoric and historic occupations.

The "Breaks" landform also contains a large number of sites and isolated finds. However an indication of the type of occupation is evidenced by the lack of previously recorded sites and the large number of isolated finds. This suggests that the prehistoric and historic utilization of this landform was more temporary leaving fewer cultural remains. It could also reflect the more dynamic nature of this landform's soils (i.e., self-churning) and its lower preservation potential. Nonetheless, it is still evident that this landform was utilized to a large extent.

Summary

The seven landform and soil associations between the Grand River and the the North Dakota-South Dakota state line vary in their geoarcheological importance (Table 21). All of the associations possess the potential to contain cultural materials; however they each provide a different soil-sediment context for preserving and dating cultural components. Those landform-soil associations mantled with Oahe Formation silt loesses are considered to have the highest geoarcheological potential. This formation provides identifiable horizonation for relative age dating, a sedimentary context to preserve site integrities and to assess site extents.

A recognizable Oahe sequence is present on the Mt1 and Mt2 soil-landform associations. The Mt1 association dates to approximately 7,000 years B.C. while the Mt2 dates at least 11,000 years B.C. The Mt2 is believed to be the only terrace with a complete soil-sediment record dating through the Early Paleoindian period. However, the Mt4 contains an unknown loess record which may date to this period as may selected sediment accumulation locales within the Missouri Breaks, Mt3, deflated erosion surface, and the erosional buttes.

The latter three landform associations have a lowered geoarcheologic potential. Their soils are primarily developed directly upon the Cretaceous bedrock and do not contain the continued Quaternary depositional context needed to separate and preserve cultural components. The context of archaeological materials found in these units soils and sediments may

Table 20. Frequency of sites and isolated finds by landform association.

Mt1	Mt2	Mt3	Breaks
39C01	39C012	39C0106	39C079
39C03	39C030		39C082
39C05	39C031		39C085
39C06	39C035		39C086
39C09	39C078		39C087
39C010	39C080		39C088
39C095	39C081		39C089
39C096	39C083		39C091
39C097	39C084		39C092
39C0108	39C090		39C093
39C0129	39C098		39C094
39C0130	39C099		39C0100
39C0134	39C0102		39C0101
39C0136	39C0103		39C0104
39C0138	39C0105		39C0107
39C0140	39C0121		39C0109
39C0141	39C0122		39C0110(IF)
IF-L/T885-1	39C0123		39C0111(IF)
IF-L/T885-5	39C0124		39C0112(IF)
IF-L/T885-10	39C0125		39C0113(IF)
39C0117*	39C0127		39C0114(IF)
39C0126*	39C0142		39C0115
	IF-L/T885-16		39C0116
	IF-L/T885-17		39C0118
			39C0119
			39C0120
			39C0128
			39C0131
			39C0132
			39C0133
			39C0135
			39C0137
			39C0139
			IF-L/T885-3
			IF-L/T885-8
			IF-L/T885-9
			IF-L/T885-12
			IF-L/T885-13
			IF-L/T885-14
			IF-L/T885-15
			IF-L/T885-18
19 sites 3 isolated finds	22 sites 2 isolated finds	1 site	28 sites 13 isolated finds

* On Floodplain

Table 21. Geoarcheologic potential of the seven mapping units in the study area.

	Geomorphic History	Soil-Sediments	Relative Age	Total
Buttes deflation surface:	1* (erosional)	1+ (downwind loess?)	1 (no context)	3.5
w/ loess	unknown	unknown	unknown	6-9 (if Oahe correlation)
w/o loess	1 (erosional)	1 (pedoturbation)	1 (no context)	3
Breaks ridges	1 (erosional)	1 (pedoturbation)	1 (no context)	3
valley	2 (depositional)	2 (pedoturbation)	3 (may correlate with Oahe)	7
Mt4	3 (height)	unknown	unknown	6-9 (if as height suggests)
Mt3	1 (erosional)	1 (pedoturbation)	unknown	3 (higher where loess accumulations are present)
Mt2	3 (at least 11,000 B.C.)	3 (at least 11,000 B.C.)	3 (at least 11,000 B.C.)	9 (complete Oahe)
Mt1	2+ (to 8,000 B.C.)	2+ (loess to 8,000 B.C.)	2+ (to 8,000 B.C.)	7.5 (Oahe record through Leonard)

High = 3
Average = 2
Low = 1

have been destroyed by natural mixing (pedoturbation). Future investigators are asked to closely examine the soil matrix to determine if pedoturbation has altered site integrities.

Finally, future investigators are asked to seek insight into the age of the Mt4 and determine the validity of the Mt2-Mt1 Oahe chronology. Age determinations for the Mt4 surface will aid in understanding the archeological potential of this landform. Establishing the validity of the Mt2-Mt1 chronology should be assigned highest priority. By understanding this complex relationship archeologists will be able to truly evaluate man-land relationships in the Missouri River Trench.

CHAPTER TEN
ANALYSIS OF SITE DISTRIBUTION PATTERNS

Thomas K. Larson

Introduction

The following analysis was conducted in order to determine if site locations exhibit distinctive environmental/locational characteristics which distinguish them from other areas along Lake Oahe (in the following section, the term "site" is also used to refer to isolated find locations). If this is the case, then it should be possible to develop models which indicate the probability of there being a cultural resource at a specified location.

In order to develop reliable models, site locations must be compared against inventoried areas where no sites have been recorded (i.e., nonsite locations). Without the use of nonsite locations, it can never be assumed the variability in site patterning is anything more than a reflection of the general environmental variability which exists within a given study area.

Site locational analyses were carried out from three perspectives - (a) considering all cultural resources as a single category; (b) considering only prehistoric resources as an analytical category; and (c) considering one particular "site type" as an analytical category. The sites which form the type analyzed separately are Plains Village occupation sites, hereafter referred to as "earthlodge villages." This site type was used in analysis because it is believed to be a functional category, it is a fairly uniform and easily defined site type, and it is one for which there have been, and will continue to be, specific research questions posed. If site patterning is observable using Plains Village occupation sites then the analysis is of extreme value, regardless of its utility when dealing with other types of sites.

Definition of Study Units

In order to examine site locational patterns, the entire 1985 inventory area was divided into square units, each 40 acres in size (i.e., 1320 feet, or 402 meters, on each side). These units would correspond to a quarter-quarter of land within a standard 640 acre section. Each forty acre unit was assigned an X and a Y coordinate based on a point of origin in the southwest corner of the block.

The proper X-Y coordinates were assigned to all recorded cultural resources within the study area. Since many sites occupy more than 40 acres, a single site could be assigned to more than one unit. Through use

of a simple computerized routine, this cultural resource locational information was examined to determine which of the 40 acre units in the area inventoried contain cultural resources. One hundred seventeen such units were defined. An equal number of units were randomly selected to be used as nonsite locations, resulting in 234, forty acre units used in the analyses.

Environmental Variables Used in Analysis

A set of 11 environmental/locational variables was measured for each of the 234, forty acre units. These variables were selected for use because they have been found to be effective in past studies (e.g., Sanders et al. 1982; Reher and Witter 1977; Roper 1979; Kvamme 1981; Larson et al. 1986) and they can be gathered from extant resources such as topographic maps, Corps of Engineers' maps and the geoarcheological mapping carried out as part of the 1985 inventory. The latter point is important because it allows gathering data of the same type and quality for both site and nonsite locations without the need to actually visit (or, in the case of the 1985 inventory area, revisit) the locations. The 11 variables are:

1. Distance to the Missouri River
2. Distance to Closest Permanent Tributary
3. Distance to Closest Intermittent Tributary
4. Distance to Timber
5. Area of Tree Cover
6. Geologic Landform Diversity Index
7. Aspect at One-Half Mile
8. Aspect at One-Quarter Mile
9. Average Slope
10. Maximum Slope
11. River Sinuosity Index

The definitions and techniques used to calculate these variables are discussed in the following paragraphs.

It is important to keep in mind that the data gathered or calculated based on regional map sources are often different than that which would be recorded in the field. Site slope measured in the field with a Brunton compass, for instance, will often produce markedly different results than slope calculated on the basis of elevation points on a map. Neither method is necessarily more "accurate" than the other; they are simply different types of measurements. Again using slope as an example, if the site slopes measured by a Brunton compass in the field were to be used in analysis, then it would be necessary to use the same technique to measure slope at all nonsite locations. To use the Brunton readings for sites and the topographic calculations for nonsite areas would be similar to "comparing apples and oranges."

Distance to the Missouri River, distance to the closest permanent tributary, and distance to the closest intermittent tributary were all calculated using a data set consisting of the digitized coordinates for all drainages within and near the study area. These readings were taken every 200 meters along a channel. The drainage was also coded as to whether it

was the Missouri River (last prereservoir channel), a permanent tributary or an intermittent tributary. A simple FORTRAN computer program was then used to compare the coordinates in the stream database to the center points of the the sample units and find the closest distances for each stream type.

A similar procedure was used to determine the distance to timber variable. In this case, the data set used contained coordinates for the edges of timber and brush mapped on 1947 Corps of Engineers maps for the Missouri River. Area of timber was calculated from the same data base. The FORTRAN V program "TREDOC" was used to calculate the area (in hectares) of tree cover within a one mile radius of the center point of the sample unit.

The geologic landform diversity index is based on the Shannon-Wiener Index (Pielou 1974) which uses the proportion of the occurrence of a given category within the community and measures the number of categories and their "evenness" in relation to one another. The use of landforms in a diversity calculation is based on two premises. First, following Roper (1979:81) it is believed that "sites are placed not only on landforms, but in relation to landforms." Secondly, landform composition affects soil development and both, in turn, ultimately influence plant growth and community patterning (cf. Hunt 1972). This relationship is especially important in regions such as the 1985 study area where cultivation and other recent human activities have masked or destroyed the past vegetative patterns and detailed surface soils maps are not yet available. In such a case it is possible that landform diversity can at least partially emulate past vegetative diversity and yield similar clues (e.g., Reher and Witter 1977) regarding human settlement of an area.

Higher diversity indexes result when more categories (landforms) are present and as the number of occurrences for each category approaches uniformity. For this implementation the "community" is defined as all points (matrix locations) falling within a circle of one mile radius centered on the given data point. The index is calculated according to the following formula:

$$\text{Diversity Index} = \left| \sum_{i=1}^{7} P_i \log e(P_i) \right|$$

where P is the proportion of the ith category within the community. The entire area inventoried, as well as the surrounding buffer areas, is represented by seven landform types (see Chapter Eight), hence the summation over seven categories. Diversity indices were calculated using the Fortran V "GEOZONE" program and a data set consisting of the coded values for geologic zones at the center points of a 200 by 200 meter grid system superimposed over the entire study area. All values within a one mile radius of the test point are used in the calculation. The result of this calculation is assigned as the landform diversity index for the given point.

The program ASPECT was used to calculate aspect, maximum slope, and average slope for sample units within the study area. The program was written in FORTRAN V and implemented on the University of Wyoming's CDC

Cyber 760. For the ASPECT program, Z (elevation) coordinates were recorded for the center point of each block. In order to calculate the aspect (see below) of each of the 234 units, it was necessary to record elevations at the center points of all of these units. It was also necessary to record additional elevations surrounding the survey area for a distance of three-quarters of a mile. Although one-half mile was the maximum radius considered, the additional one-quarter mile is necessary in order to avoid edge-effect distortions. Elevations were recorded in feet taken from USGS topographic maps of the area.

Aspect is defined as the measure of view spread (after Kvamme 1981:4). View spread is an arc, measured in degrees, which extends downhill from the elevational contour line that passes through the given point. The size of the arc is determined as any view extending for at least a given distance. Therefore, the value of aspect for a given point is the arc which describes the widest unobstructed view extending out a specified distance. In the case of this 1985 Lake Oahe study, two different radii, one-half mile and one-quarter mile, were used to calculate two separate aspect variables.

The program ASPECT forms an n x m matrix (n = rows, m = columns) of Z values (elevations) where the matrix location (i,j) corresponds to the appropriate center point of a 40 acre block (defined as an x, y coordinate pair). Calculations for slope and aspect are based on this matrix of known points. In calculating the aspect for a given center point the program interpolates elevations at 100 meter intervals along a radius extending out from the center point for total distances of one-quarter and one-half mile. Elevations are interpolated for points along radii beginning with the radius at 0 degrees azimuth and continuing at 10 degree intervals, ending with the radius at 350 degrees azimuth. Matrix location (i-1,j) is 'north' of, or 0 degrees from matrix location (i,j). If an interpolated elevation for any point along a radius is greater than the elevation of the center point the view is said to be closed along that radius.

If all interpolated elevations along a radius are less than the center point elevation the view is said to be open along that radius. Ten degrees is added to the current open arc measurement if the previous radius was also open, or the current open arc measurement is set at ten degrees if the previous radius was closed. All open arcs within the circle are calculated in this manner and the largest of these is chosen as the value of aspect for the given point.

Z values for interpolated points are calculated using a weighted average of the Z values of the eight nearest known points according to the following formula:

$$ZI = \frac{\sum_{i=1}^{8} w_i z_i}{\sum_{i=1}^{8} w_i}$$

where ZI is the calculated Z value for the interpolated point, z_i is the Z value of the ith nearest known point, and w_i is the weight of the ith nearest point, $w_i = 1/d_i^2$. The value d_i is the Euclidean distance between the interpolated point and the ith nearest known point. Using this method,

closer known points contribute more to the calculated Z value of the interpolated point, while known points further away contribute less.

Average slope is determined by the mean of the slopes (in percent grade) between each data point and the eight adjacent points in the grid system. Maximum slope is the largest of these eight values. Percent grade is calculated as:

$$\left| \frac{ZC - ZN}{D} \times 100 \right|$$

where ZC and ZN are the elevation at the center point and the elevation at an adjacent point, respectively, and D is the distance between these points.

Stream sinuosity is the ratio of channel length to down valley distance (Leopold et al. 1964:281). Since the sinuosity of a river channel influences vegetational and soil characteristics of a given length of river valley, it was believed that sinuosity might also influence settlement patterns. The sinuosity index was calculated at the closest point on the Missouri River to each of the 40 acre sample units. X-Y coordinates along the branches of the Missouri River, taken approximately every 200 meters downstream, were entered into a data file using USGS topographic maps and a digital graphics board. A CDC BASIC program was then used to compare this database for the river to the file containing the X-Y coordinates of the forty acre units. The closest point on the river was determined and used as the center point for determining the sinuosity index. All river points within one mile upstream and one mile downstream (straight line distances) were selected from the database. These were then used to calculate the length of river channel which exists within a one mile radius of the center point. That distance was then divided by the minimum channel length (i.e., two miles) passing through the center point. The resultant figure was used as the sinuosity index.

Logistic Regression

The multivariate statistical technique stepwise logistic regression (Engelman 1981) was performed on the 11 environmental variables discussed above in order to evaluated their classificatory power. The use of the logistic regression technique in predictive site modelling is discussed by Kvamme:

> This procedure is logistic regression (Wrigley 1976) and it has been shown, both theoretically and empirically, to offer improved classificatory performance over discriminant analysis in non-normal situations (Press and Wilson 1979; Maynard and Strahler 1981). For example, Press and Wilson (1979) found a mean improvement of 12% and Maynard and Strahler (1981) showed a 39% increase in classification accuracy over corresponding discriminant analyses of sample data. Maynard and Strahler (1981) argue that logistic regression is the optimal statistical pattern

> classifier for most situations (those lacking multivariate normality); the cost is increased computation effort. Like discriminant analysis, logistic regression defines a linear decision boundary that optimally separates the groups when group variance structures are assumed to be equal.
>
> The logistically devised posterior probability that location $\underline{i}$ belong to group 1 (the site group) is repeated here in matrix form...
>
> $$p = \frac{e^{\alpha + \underline{X}}}{1 + e^{\alpha + \mathbf{B}\underline{X}}} = \frac{1}{1 + e^{-(\alpha + \mathbf{B}\underline{X})}}$$
>
> where $\underline{X}$ is a vector containing measurements of the environmental predictor variables at location $\underline{i}$. **B** is a vector of weights, and α is an intercept term (Wrigley 1976:10) [Kvamme 1983:72-73].

The "e" represents the base of natural logarithms (2.71828183). The BMDP program Stepwise Logistic Regression (Engelman 1981) was performed using the 11 environmental variables at the 117 site locations and 117 randomly selected nonsite locations. In the first run, all cultural resources (both historic and prehistoric) were considered as the site group. The stepwise procedure selected the variables distance to Missouri River, area of timber, geologic landform diversity index, aspect at one-half mile and maximum slope as contributing to the model. The logistic regression coefficients for these five variables and a presentation of the overall accuracy of the model are presented in Table 22.

In the second run, only prehistoric cultural resources were considered as the site group. This time the stepwise procedure selected the variables distance to Missouri River, distance to timber, area of timber, geologic landform diversity index, aspect at one-half mile and maximum slope as contributing to the model. The logistic regression coefficients for these six variables and a presentation of the overall accuracy of the model are presented in Table 23.

The comparison of earthlodge village locations to nonsite locations reveals an extremely strong pattern. Stepwise logistic regression selected the variables distance to the Missouri River, distance to the first permanent tributary, distance to the first intermittent tributary, distance to timber, area of timber, aspect at one-half mile, aspect at one-quarter mile, and maximum slope as contributing to the model. As shown by the summary figures presented in Table 24, the model for earthlodge villages exhibits an overall accuracy of 97.08 percent.

The utility of such models can easily be demonstrated with an example from the 1985 Lake Oahe data set. Looking for the moment only at the model for earthlodge villages and therefore using the variables listed in Table 24, the following environmental measurements were gathered at 39CO78 (a Plains Village site): Distance to the Missouri River - 4055 meters, distance to the first permanent tributary - 1304 meters, distance to the first intermittent tributary - 156 meters, distance to timber - 51 meters, area of timber - 298 hectares, aspect at one-half mile - 250 degrees,

Table 22. Logistic coefficients and overall classification accuracy of five environmental variables used in the test of all cultural resources versus nonsite locations.

intercept or constant (α) = -.768

Variable Name	Coefficient (β)
Distance to the Missouri River	-0.0000711
Area of tree cover	0.00654
Geologic diversity index	1.26
Aspect at one-half mile	0.00438
Maximum slope	-0.243

	PREDICTED* 0	PREDICTED* 1	ACTUAL
0	88 (75.21%)	29 (24.29%)	117
1	33 (28.21%)	84 (71.79%)	117

Overall accuracy of the model = 73.50%

* 0 = nonsite locations; 1 = site locations

Table 23. Logistic coefficients and overall classification accuracy of six environmental variables used in the test of prehistoric cultural resources versus nonsite locations.

intercept or constant (α) = -3.41

Variable Name	Coefficient (β)
Distance to the Missouri River	-0.000147
Distance to timber	0.00118
Area of tree cover	-0.0145
Geologic diversity index	1.51
Aspect at one-half mile	0.00548
Maximum slope	-0.282

	PREDICTED* 0	PREDICTED* 1	ACTUAL
0	101 (86.32%)	16 (13.68%)	117
1	30 (41.10%)	43 (58.90%)	73

Overall accuracy of the model = 75.79%

* 0 = nonsite locations; 1 = site locations

Table 24. Logistic coefficients and overall classification accuracy of eight environmental variables used in the test of earthlodge villages versus nonsite locations.

intercept or constant (α) = 8.67

Variable Name	Coefficient (B)
Distance to the Missouri River	-0.00243
Distance to first permanent tributary	0.00198
Distance to first intermittent tributary	-0.000536
Distance to timber	-0.0117
Area of tree cover	0.0847
Aspect at one-half mile	-0.0754
Aspect at one-quarter mile	0.0754
Maximum slope	-3.440

	PREDICTED* 0	PREDICTED* 1	ACTUAL
0	115 (98.29%)	2 (1.71%)	117
1	2 (10.00%)	18 (90.00%)	20

Overall accuracy of the model = 97.08%

* 0 = nonsite locations; 1 = site locations

aspect at one-quarter mile - 270 degrees, and maximum slope - 8 percent. Multiplying these values times their appropriate logistical regression coefficients and adding this to the intercept term (see Table 24) yields the value of 1.307186. Putting this value into the equation given above in the Kvamme quote yields a P (i.e., the probability of an earthlodge village at this location) of 78.70 percent. This area would have been correctly classified even if we had not known already that there was a site at that location. Calculating the variables in the manner described in the beginning of the chapter and entering these, along with the appropriate logistical regression coefficients from Table 24, will yield the probability of an earthlodge location in any 40 acre unit within the 1985 study area. Similar procedures could also be carried out to predict the presence of any type of site or any type of prehistoric site using the results presented in Tables 22 and 23.

Discussion

The above analysis demonstrates several important points. When it is possible to typologize sites into categories which have functional meaning (such as earthlodge villages), the predictive power of the model appears to increase dramatically (see Tables 22-24). This approach must be tempered, however, by the fact that of each of the functional categories must have a sufficient sample of sites in order to produce reliable results.

When functional site types cannot be determined with any degree of accuracy, it still appears that a model based on all cultural resources within the area inventoried has some value. From a management standpoint, the mathematical model using the figures in Table 22 could be used to predict where new sites may be exposed through erosion, low water, or better surface visibility. Such models can easily be projected graphically and may be of benefit to future monitoring efforts along Lake Oahe.

CHAPTER ELEVEN
SUMMARY AND RECOMMENDATIONS

Paul H. Sanders

Introduction

The following chapter summarizes the results of the 1985 cultural resource inventory of portions of the Right Bank of Lake Oahe in Corson County, South Dakota. Summaries are provided on the inventory results, the lithic, geoarcheological and site locational analyses and discussions of impacts, recommendations and eligibility of the recorded sites for nomination to the National Register of Historic Places.

Inventory Results

The cultural resource inventory resulted in the investigation of 75 sites representing a wide range of site types and chronological periods. The inventory relocated 10 previously recorded sites, 33 new prehistoric sites, 32 new historic sites and 18 isolated finds. Five of the historic sites were not revisited due to high water levels and therefore were not assigned Smithsonian site numbers. Three of the eleven previously recorded sites contain both historic and prehistoric components (39C03, 39C05 and 39C09). All of the eleven sites contain evidence of Plains Village occupations and/or earthlodge depressions.

The new sites consist primarily of artifact scatters, probable burial mounds, stone circles and rock cairns. Diagnostic artifacts from these sites indicate occupation of the project area from the Middle Plains Archaic period into Late Plains Village times. Evidence of earlier occupations is only in the form of isolated finds which is typical of the Middle Missouri Subarea and the Dakotas in general. Possible early occupations may be found within the paleosols at sites 39C090 and 39C0102.

A number of mound sites located within or adjacent to the project area may be associated with the Sonota Complex (Neuman 1975). Prior to this inventory a gap existed in the distribution of the known Sonota sites. Three sites (39C081 and 39C086 within the project area and 39C0206 just outside) essentially fill in the gap between the main concentration approximately five miles south of Mobridge and Boundary Mound (32SI1) on the North Dakota-South Dakota border. Additional investigation of these sites will be necessary to determine their actual cultural affiliation.

Four non-earthlodge Plains Village sites (39C082, 39C093, 39C095 and 39C096) were recorded. The importance of sites such as these lies in the information they can provide on off-village activities of the Plains Village groups. Numerous authors and early Euroamerican explorers and fur traders reported the seasonal activities of the Plains Villagers beyond the villages, however little is known archeologically about these activities or

the sites that resulted from them. Unfortunately, little is left of these four particular sites.

Chronologically, the Plains Village sites do not differ from the patterns which were expected. No Initial Coalescent or Initial Middle Missouri variant components were located. However test excavations at any number of Plains Village sites within the project area could potentially, although unlikely, locate these early Plains Village components since according to Lehmer (1971) they are only known in areas far to the south.

Although no early Plains Village sites or ceramic assemblages have been documented within the project area, the radiocarbon dates from Jake White Bull (39C06) and Davis or Lower Grand site (39C014), located immediately outside the project area on Indian Memorial Island indicate otherwise. Radiocarbon dates from these sites indicate occupations during the 11th and 14th centuries A.D. (Ahler 1977b:133). Given Lehmer's (1971:33) chronology Jake White Bull (along with Helb [39CA208]) probably represents one of the first Extended Middle Missouri villages in this area.

The age of the Extended Coalescent Davis site is especially intriguing since according to Lehmer (1971:33), Coalescent groups had barely entered South Dakota and at that time with a different ceramic assemblage. These two sites raise the question of the temporal validity of Lehmer's chronology and points to the need for additional radiocarbon dates as well as a precise examination of the Mobridge area for possible local contamination which somehow may be responsible for the early dates.

The last of the prehistoric sites to be discussed here concern the sites containing stone features. Seven sites consisting of three stone circles and four sites with rock cairns were located within the project area. A number of rock cairns were also recorded at 39C06 which the Smithsonian Institution-River Basin Surveys (see Volume 2, Appendix C) suggest are burials. Several of the rock cairns contained depressions within their interiors suggesting that they had been potted or perhaps an internal chamber/collapsed grave. The function of these cairns remains to be determined; however, it is also interesting to note that they also occur on two of the stone circle sites, 39C092 and 39C0107. Zimmerman (1985) has suggested that such sites are the result of Sioux occupation. If so, then perhaps the rock cairns are prehistoric/historic Sioux burials or a result of Native American religious practices. Their isolated occurrences definitely contrast with the burial pattern of the Plains Village groups. These sites are also another category requiring additional work.

The historic sites recorded during the inventory include a town, missions, homesteads and artifact scatters or trash dumps. The former town of Kenel also contained the St. Benedict's Mission and cemetery. Other cultural remains believed to be associated with missions include 39C0131 and 39C0142. In addition, site 39C0116 may be associated with a YMCA. The role and function of such organizations in terms of their interaction with the Native American residents has yet to be adequately documented, either archeologically or through archival research.

Most of the historic sites within the project area consist of foundations and/or depressions relating to Sioux occupations. No standing structures are present at any of these sites; however, many have the

potential to contain buried cultural deposits which could provide key information on Siouan culture change during the early reservation and Depression eras.

Analytical Results

The analysis of the artifact assemblage from 24 artifact scatters attempted to examine patterns in lithic resource utilization. This analysis basically expanded temporally and geographically Ahler's (1977b) investigation. The result of the analysis indicated that Knife River flint was the dominant raw material type utilized throughout the project area both temporally and geographically. An apparent exception to this occurs with the Coalescent Traditions non-earthlodge village sites where a wider variety of raw materials were utilized, duplicating Ahler's (1977b) results. This suggests that the pattern of lithic resource utilization remained relatively constant until the arrival of the Coalescent Tradition peoples.

The geoarcheological investigation attempted to delinate the age and evolutionary sequence of landforms within the project area. Seven landform associations were identified, consisting of a series of erosional buttes, a deflated erosion surface, dissected "breaks", three fluvial accumulation terraces and one erosional cut terrace. The primary purpose of the investigation was to examine the potential of these landforms to contain buried cultural deposits and their relative age.

The result of the investigation indicated that all of the landforms have the potential to contain cultural deposits, however, the integrity of such deposits vary from one landform to the next. Landforms with the highest potential are those which are capped by sediments referable to the Oahe Formation. This formation is present on the Mt1 and Mt2 terraces although the Mt1 sequence lacks the early Mallard Island and lower Aggie Brown members and as such was only available for occupation after approximately 7,000 years B.C.

The other landforms capped by loess also have a good potential but do not appear to exhibit the Oahe Formation sequence. This prevents the relative dating of any buried cultural deposits. Such areas do have the potential to contain the full range of cultural occupations from the Paleoindian period onward but would have to be dated by radiocarbon samples or diagnostic artifacts.

The erosional cut terrace and the "breaks" have the lowest potential within the project area. This is because the sediments within these areas do not preserve archeological deposits very well, due to slopewash and pedoturbation.

The site patterning analysis presented in Chapter Nine has demonstrated that the location of Plains Village occupation sites ("earthlodge villages") is highly predictable. It is suggested the mathematical model presented for the location of these sites could be used to predict the location of village sites in uninventoried areas. The same model could also be used to predict where unrecorded sites may become exposed due to low water, erosion or increased ground visibility.

Management Recommendations

The management recommendations for the recorded sites are listed in Table 25. This table summarizes the impacts to each site, recommendations for additional work and eligibility for nomination to the National Register of Historic Places. The rate of impact for eligible and potentially eligible sites is also listed in Table 25. More specific information concerning pertinent management recommendations and research topics is presented within the individual site descriptions (see Chapter Six and Seven). Two sites are listed on the National Register of Historic Places, two sites are considered eligible, 46 components at 45 sites are believed to be potentially eligible while 27 sites and all 18 isolated finds are not considered eligible.

The criteria utilized to assess each sites eligibility was essentially Criterion D of 36CFR60.6:

> To be considered for listing under Criterion D, a property must have yielded or must have the potential to yield important information about some aspect of prehistory or history, including events, processes, institutions, design, construction, settlement, migration, ideals, beliefs, lifeways, and other facets of the development or maintenance of cultural systems. Criterion D allows consideration of both properties that have yielded important information and that have not yet yielded important information but are likely to do so. Any consideration of a property's eligibility under Criterion D must address (1) whether the property has the information to contribute to our understanding of history or prehistory <u>and</u> whether that information is important (National Park Service 1982:28).

Another factor used in assessing significance is the concept of integrity.

> The principal test to establish whether a property retains integrity is to ask whether or not the property still retains the identity or character for which it is important. For a property important for its information potential, it is necessary to determine whether the property retains enough of its original materials and their spatial relationships to be capable of yielding valuable data....A buried site eligible for its information potential has integrity if the deposits retain enough of their original content and spatial relationships to be capable of yielding valuable data (National Park Service 1982:39-40).

Field assessments of site integrity as well as ability to yield additional significant information involved density, type, and variety of cultural remains, presence/absence of artifact concentrations or features (e.g., hearths, historic or prehistoric depressions, etc.), soil depth, presence/absence of buried cultural materials and surface disturbances. For example, a site comprised of scattered artifacts and occurring within a

Table 25. List of site management information.

Site Number	Impact/Rate*	Recommendations	Eligibility
39C01	Eroding - Exposed at 1610' pool elevation (2)	Test excavations	Potentially eligible
39C03	Rapid cutbank erosion (1)	Test prehistoric component	Prehistoric component potentially eligible
39C05	Rapid cutbank erosion (1)	Test prehistoric component	Fort Manuel enrolled but completely eroded Prehistoric component potentially eligible
39C06	Rapid cutbank erosion (1)	Preserve/mitigate	Enrolled
39C09	Cutbank erosion (2)	Monitor Cutbank Erosion for additional burials	Cemetery - Eligible
		Test - Extended Coalescent Component	Potentially eligible
39C010	Eroding - Exposed at 1605' pool elevation (2)	Test site's integrity	Potentially eligible
39C012	Intact (3)	Test excavations	Potentially eligible
39C030	Intact with minor slumping (3)	Test excavations	Potentially eligible
39C031	Under cultivation (2)	Restrict cultivation/ Test excavations	Potentially eligible
39C035	Some slumping (3)	Test excavations	Potentially eligible
39C078	Some slumping (3)	Test excavations	Potentially eligible
39C079	None (3)	No further work	Not eligible
39C080	Minor erosion (3)	Test excavations	Potentially eligible
39C081	Road cut and minor erosion (3)	Test excavations	Potentially eligible
39C082	Wave action cutbank erosion	No further work	Not eligible
39C083	Minor erosion (3)	Test excavations	Potentially eligible

Table 25 (cont.). List of site management information.

Site Number	Impact/Rate*	Recommendations	Eligibility
39C084	Minor erosion	No further work	Not eligible
39C085	Minor sheetwash erosion	No further work	Not eligible
39C086	None (3)	Test excavations	Potentially eligible
39C087	Minor sheetwash erosion	No further work	Not eligible
39C088	Minor sheetwash erosion	No further work	Not eligible
39C089	None (3)	Test excavations	Potentially eligible
39C090	Cutbank erosion (2)	Test excavations	Potentially eligible
39C091	Cutbank erosion (2)	Test excavations	Potentially eligible
39C092	Pothunting (3)	Test excavations	Potentially eligible
39C093	Wave action	No further work	Not eligible
39C094	Pothunting (3)	Test excavations	Potentially eligible
39C095	Wave action	No further work	Not eligible
39C096	Wave action	No further work	Not eligible
39C097	Wave action	No further work	Not eligible
39C098	Grazing (3)	Test excavations	Potentially eligible
39C099	Massive slumping, rapid erosion (1)	Test excavations	Potentially eligible
39C0100	Grazing	No further work	Not eligible
39C0101	Grazing	No further work	Not eligible
39C0102	Slumping (2)	Test excavations	Potentially eligible
39C0103	Cultivation	No further work	Not eligible
39C0104	Grazing	No further work	Not eligible
39C0105	Cultivation (2)	Test excavations	Potentially eligible
39C0106	Two track road (3)	Test excavations	Potentially eligible

Table 25 (cont.). List of site management information.

Site Number	Impact/Rate*	Recommendations	Eligibility
39CO107	Grazing (3)	Test excavations	Potentially eligible
39CO108	Grazing (3)	Test excavations	Potentially eligible
39CO109	Grazing (3)	Test excavations	Potentially eligible
39CO115	Wave action	No further work	Not eligible
39CO116	Grazing (3)	Test excavations and archival research	Potentially eligible
39CO117	Grazing (3)	Test excavations and archival research	Potentially eligible
39CO118	Partially inundated	No further work	Not eligible
39CO119	Cutbank erosion (2)	Test excavations	Potentially eligible
39CO120	Wave action/ (2) possible inundation	Test excavations	Potentially eligible
39CO121	Grazing (3)	Test excavations	Potentially eligible
39CO122	Cultivation	No further work	Not eligible
39CO123	Grazing	No further work	Not eligible
39CO124	Grazing	No further work	Not eligible
39CO125	Grazing (3)	Test excavations	Potentially eligible
39CO126	Grazing	Test excavations	Potentially eligible
39CO127	Grazing (3)	Test excavations	Potentially eligible
39CO128	Grazing (3)	Test excavations	Potentially eligible
39CO129	Grazing (3)	Test excavations	Potentially eligible
39CO130	Grazing (3)	Test excavations	Potentially eligible
39CO131	Rapid cutbank erosion (1)	Archival research	Potentially eligible
39CO132	Grazing	No further work	Not eligible
39CO133	Grazing (3)	Test excavations and archival research	Potentially eligible
39CO134	Grazing	No further work	Not eligible

Table 25 (cont.). List of site management information.

Site Number	Impact/Rate*	Recommendations	Eligibility
39C0135	Cutbank erosion (3)	Test excavations	Potentially eligible
39C0136	Rapid cutbank erosion (1)	Test excavations	Potentially eligible
39C0137	Grazing (3)	Test excavations	Potentially eligible
39C0138	Grazing (3)	Test excavations	Potentially eligible
39C0139	Grazing (3)	Test excavations	Potentially eligible
39C0140	Grazing	No further work	Not eligible
30C0141	Grazing	No further work	Not eligible
39C0142	Grazing (3)	Archival research	Potentially eligible
L/T 885-2	Inundation	No further work	Not eligible
L/T 885-3	Inundation	No further work	Not eligible
L/T 885-5	Inundation	No further work	Not eligible
L/T 885-8	Inundation	No further work	Not eligible
L/T 885-144	Inundation (3)	Archival research	Potentially eligible

*Priority and rate of impact for eligible and potentially eligible sites:

(1) High
(2) Medium
(3) Low

plowed field would generally be considered to have little integrity or significance. If, however, concentrations of cultural material were present within the plowed area, then the site could be considered to retain a degree of spatial integrity and depending upon the cultural materials present, could be considered worthy of additional investigations.

These field assessments were later rechecked against known prehistoric and historic chronologies, document searches and pertinent research topics to determine if the site could yield additional important information.

As noted above, the key question concerns the importance of the information content of a particular site. For the present project, this was assessed according to current or pertinent research topics as well as the potential of the site to contain additional cultural materials which could address these topics. Many of the topics pertinent to the project area, are discussed by Buechler (1984) within the Grand-Moreau Study Unit. Most of Buechler's (1984:50-51) topics deal with Plains Village sites; however, others concern the more general problems of chronology, subsistence practices, paleoenvironmental reconstruction and Sioux adaptation to reservation life. Studies such as Ahler et al. (1974, 1977), Lehmer (1970, 1971), Frison (1978), Neuman (1975), Reeves (1983), Zimmerman (1985), Zimmerman and Steward (1981) and others provide additional background information concerning these topics and the manner in which they can be applied.

Basically the main concern of current research topics are related in that they call for more detailed analyses of the cultural remains in order to discuss the broader topics of prehistoric and historic settlement and subsistence and cultural chronology, interaction change and adaptation. Such detailed analyses could yield information on such questions as:

1) What factors were responsible for the development of the Sonota Complex in this particular area?

2) Are the radiocarbon dates from the Jake White Bull, Helb and Davis sites truly indicative of early Plains Village occupations and if so are other local Plains Village sites equally early?

3) Except for 39CO12, all the known Extended Coalescent villages within the project area are unfortified. This is curious in light of the fact that the contemporary Terminal Middle Missouri villages occurring in North Dakota are typically fortified. What is the nature of these occupations and their actual relationships to one another or other cultural groups?

4) A relatively large number of rock cairns were located during this inventory. What is the function of these cairns and are they prehistoric, historic or both?

5) As well as can be determined, all of the historic sites are attributed to Reservation Period Sioux occupation. What do these sites indicate concerning Native American acculturation or settlement and subsistence practices compared to prehistoric or contemporary Euroamerican occupations?

Another important consideration presented in Table 23 involves the adverse impacts to the eligible or potentially eligible properties within the project area. The most devastating impacts are those relating to the impoundment of the Missouri River: inundation and wave action. Fluctuations in the lake level are perhaps the most destructive since a site could be above water one year and in no danger of erosion while in another year higher water levels could start eroding the site away. The massive amount of cultural material on the beach in front of 39CO6, the Jake White Bull site, is a prime example. Erosion advanced as much as ten meters into the site in a single year as a result of record high lake levels.

The erosion of the lake shore by wave action not only impacts sites directly on the shoreline but can also impact sites much farther away. The erosion of the land along the shore decreases the support of the upland areas often causing massive slumping (see Figure 91 top). The exposure of areas such as these along the shoreline facilitates the location and identification of many sites along the Missouri Trench. While this is a boon to many archeologists, it also aids nonprofessionals in the location of many sites. Although many of these people are content to merely look at these materials or surface collect off the beach, others are more destructive, digging into features exposed in the cutbanks (see Figure 91 bottom). Unfortunately, the creation of Lake Oahe has not only exposed many sites, it has also provided easy access by boat to many sites which were originally more difficult or time consuming to reach by land. As a result, the Corps of Engineers management of these irreplaceable resources becomes even more critical and important before they are totally destroyed.

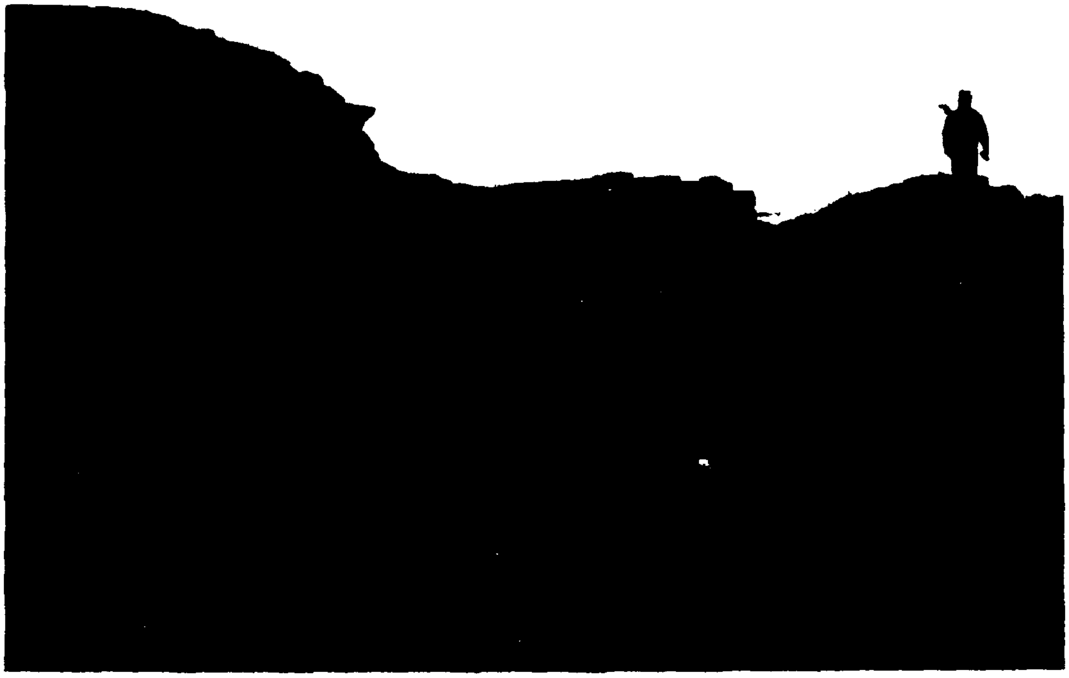

Figure 91. Impacts to project area. Slumping (top) and pothunting (bottom).

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APPENDIX A

A PLANT RESOURCE BASE FOR THE MIDDLE MISSOURI RIVER SUBAREA, SOUTH DAKOTA

APPENDIX A
A PLANT RESOURCE BASE
FOR THE MIDDLE-MISSOURI RIVER SUBAREA

Keith H. Dueholm and Paul H. Sanders

The following discussion presents a concise list of potential plant resources which were available for utilization by aboriginal peoples within the Middle Missouri subarea. The discussions include principal uses based on ethnographic accounts, distributions by community, seasonality and potential archeological implications. The data presented are intended to provide researchers with a data base which may aid in addressing questions concerning, for example, site locational analyses, (e.g., Archer et al. 1982) settlement and subsistence patterning, paleoenvironmental reconstruction or seasonality of site occupancy. Most of these questions are currently invoked concerning an archeological site's significance and ability to yield additional information concerning the prehisory of the region (see e.g., Buechler 1984). As a result, the following information should be considered a pertinent and timely addition to the ecology of the region and aboriginal peoples adaptation.

The use of wild plant foods was important to the survival of North American Indians. Even among such established agriculturalists as the Southeastern Indians of the United States: They "enjoyed a diversified food supply that included both wild and domesticated foods, and it is important to realize that wild food was historically the more basic of the two", and, "...agriculture influenced rather than shaped the fundamental nature of their cultural and social organization" (Hudson 1976:272). Plant life, "an important part of [their] diet", was thoroughly exploited (Hudson 1976:285). The most important were roots and tubers, followed by a variety of wild fruits and berries, nuts, and seeds. Nonagricultural Indians, such as those of the Great Basin, relied on numerous wild plants as a large necessary part of their diet (Steward 1938).

Nomadic Plains Indians also utilized many plants (e.g., Grinnell 1923, for the Cheyenne). Although the more sedentary Plains Village groups of the Middle Missouri relied heavily on agricultural crops (Will and Spinden 1906), wild plants were also utilized for a variety of purposes. An early observer claimed they knew many roots which were very important to survival during "frequent famines" (Abel 1939:98). Even during less severe times berries were highly utilized and the root of prairie turnip (Psoralea esculenta) was considered a valuable trade item for those who could obtain large quantities of it (Abel 1939).

Plants have several valuable characteristics, including the following:

1. They provide nutrients and vitamins needed to balance the diet (Harrington 1967; Yarnell 1964).

2. A good diversity of edible plants and uses of plants relieves monotony in the diet. Certain plants can be eaten raw as a salad, others can be

cooked as potherbs, others can yield starchy roots when baked like potatoes, and still others can be used to season meat or make a hot drink.

3. A good diversity also allows for reliance on alternate species if primary or preferred sources should fail in any given year. Included here would be emergency foods utilized during times of acute food shortage. For instance, Steward (1938) reports that in the Great Basin the production of seeds is correlated with rainfall, and that some years have high seed productivity and others almost none.

4. Plants are nonmotile. Although many plants have a scattered distribution some may be concentrated in certain situations. Therefore one might expect or predict that continual exploitation of such concentrations would be visible in archeological record by similar concentrations of functionally or procurement related cultural materials. Conversely sites related to the exploitation of plants with scattered distribution could be expected to occur as dispersed cultural materials (e.g., isolated finds).

5. Plants are somewhat predictable, in seasonality and location. Allowing for yearly variation in productivity, especially in berries and seeds as mentioned above, an area known to contain concentrations of desirable plants can be exploited year after year. As mentioned above, this should result in a higher density of cultural materials adjacent to such concentrations.

Seeds and fruits recovered from archeological sites in the Middle Missouri subarea provide ample evidence of utilization of the native plant resources. Charred remains of several plants reported in Nickel (1977) and Benz (1977) include several fruit parts or wild "weed" seeds. In addition to the major cultivated crops of corn, beans and squash, they found sunflower, chokecherry, wild plum, rose, hackberry, hawthorn (Crataegus rotundifolia), Chenopodium spp., Iva, Polygonum, Rumex, vetch or wild pea (Vicia or Lathyrus) and fruits of grasses such as panicgrass (Panicum sp.) and cordgrass (Spartina sp.). The age of dated sites in Nickel (1977) was from 100 A.D. to 1600 A.D. His preliminary conclusions were that overall a much greater diversity of plant resources was exploited relatively early in village occupation of the Middle Missouri, especially indigenous grasses and weeds along with native cultigens of sunflower and Iva, even though the resource base may have been utilized quite differently within the Coalescent and the Middle Missouri Traditions. It should be noted that Iva has not been observed locally and its prehistoric occurence at the Helb site (Falk and Calabrese 1973) appears to represent a prehistoric introduction of the plant which has since been out competed by native vegetation.

It has recently been recognized (Hudson 1976:258) that "... modern anthropologists have come to understand that (preliterate people) possess remarkably detailed knowledge of their environment," including, of course, plants. However, many uses such as gathering of greens, young shoots, or roots for food, or various plant parts for medicinal use involve soft plant tissues which are not preserved in archeological sites, except under exceptionally favorable circumstances (see e.g., Minnis 1981). Even if a fragment of charred root or tuber were recovered and recognized, species

identification would probably be impossible. As a result, the archeological record is biased against plants not composed of some type of hardened tissue, such as nuts, many seeds, fruit pits and wood.

In order to provide a realistic plant resource base for the Middle Missouri a list of plants was compiled from distribution maps of the Great Plains flora (Great Plains Flora Association 1977) which includes plants knows to occur in Corson County, South Dakota. These maps are based on specimens in numerous herbaria, and a dot is present in each county from which a specimen has been collected. Since reservation lands have probably been less extensively sampled, species known from neighboring counties along the Missouri River were also added to the list. These include Campbell, Dewey and Walworth counties in South Dakota and Emmons and Sioux counties in North Dakota. The final list contained 650 species of vascular plants, seventy-seven of which are introduced taxa, leaving 573 native taxa to form the baseline data presented in Table 1.

Table 1 lists the native plants with known historical uses and also summarizes the uses and assigns the taxa to the ten plant communities described in the vegetation section of Chapter Two. Genera containing more than one species with the same or similar use are included under the generic name (e.g., 28 species of Carex becomes Carex 28 spp.). Uses are based on the literature and includes information for tribes from the region (Rogers 1980 for the Sioux; Gilmore 1919 for Missouri River tribes), from elsewhere in the Great Plains (Grinnell 1923 for the Cheyenne; Hellson and Gadd 1974 for the Blackfeet), the Great Basin (Steward 1938), and from general treatments (Harrington 1967; Medsger 1966; Vogel 1970; and Yanovsky 1936). By using a variety of sources, from different areas, ensures the inclusion of species for a realistic resource base. Certainly no single group utilized all the plants on the list or necessarily used the same species for similar purposes. As a consequence, many of these peoples which are known to have occupied, passed through or visited the region for trading would be expected to exploit the local plant resource base in their own accustomed manner. Because of these cultural factors, as well as past environmental changes which may have altered the abundance or presence of different plant species, the inclusion of the species on the list from a variety of sources seems appropriate.

The plants listed in Table 1 have also been assigned to various use-related categories. Greens are generally young shoots, leaves or stems which were usually eaten raw or cooked as potherbs. Underground is a category for roots, tubers, rhizomes and bulbs which were baked, ground for flour, constitute ingredients in stews or soups or eaten raw. Fleshy fruits mainly consist of berries or are at least berry-like (i.e., juicy). They may be eaten immediately, dried for later use and also provide an important constituent of pemmican, etc. Nonfleshy fruits include dry fruits such as acorns, and seeds which were often parched and ground into flour. This latter category also includes the "fruit-like" ground plum (Astragalus crassicarpus) and milkweed (Asclepias spp.) which were generally cooked as potherbs (Harrington 1967). Beverage plants were used in making warm drinks (i.e., teas) and obtained largely from the leaves. Flavoring includes primarily the leaves and seeds of plants used in seasoning meat or soups and for thickening stews. Emergency plants are those speicies normally not eaten or a plant part not usually eaten, but which were eaten in emergency or starvation situations. An example of the

latter is the inner bark (cambium) of cottonwood. Medicinal is a broad category encompassing all reported medicinal uses, both internal and external. Another broad category is Manufacture. This includes plants used for a variety of purposes, usually household in nature, including weaving of mats or backrests, lining of firepits, stuffing for pillows, etc., tanning and dyeing uses and in making arrow shafts. Construction plants also includes the use of trees in building earthlodges, and tall grasses or rushes for thatching. Miscellaneous has five subcategories: a=smoking material; b=gum; c=sap; d=ceremonial or play plants; and e=cosmetic, primarily as soap or deoderant.

Individual taxa in Table 1 have been assigned to the ten plant communities described in Chapter Two. The distribution of the number of species within the communities is based on personal observations along the Missouri River in North Dakota, supplemented by the literature, especially Stevens (1970) and Gleason and Cronquist (1963) for the numerous species of Carex. Although it would have been desirable to include information on the average densities or even general abundance of individual species within each community this was available for only a few species and therefore was not included in this study.

Many things may be interpreted from the data in Table 1. It is immediately apparent that a large resource base consisting of a total of 334 taxa is present in the Middle Missouri Area. Of this total, numerous species are available for medicinal use, manufacture, making beverages and seasoning. Besides enhancing the flavor of bland foods, many of the latter species may have important nutritional value (Yarnell 1964). Seventeen species were used for construction purposes. Eighteen can provide emergency food, but many of the normal edible plants, such as rhizomes of wheatgrass, could have also served as emergency food with proper preparation. In addition, a large variety of greens and nonfleshy fruits and seeds and a fair amount of underground plant parts and fleshy fruits are present in the area. This resource base could be drawn upon by various occupants of the region based on prior experience and tradition, trial and error or cultural diffusion of knowledge from other areas.

It is evident that some of the plants listed in Table 1 were probably more thoroughly exploited than others. Their relative importance can be inferred from the number of references cited for each taxa in Table 1. A partial list of what appears to be some of the more widely used include: Echninacea and Ratibida for medicine; fleshy fruits of Amelanchier, Prunus, Ribes (3 species each), Rosa, Rubus (2 species each) and Shepherdia; underground parts of Helianthus tuberosus, Psoralea, and Sagittaria; greens of Chenopodium, Helianthus (6 species) and Quercus. It is also apparent that some widely utilized plants like Psoralea were exploited only for their root while others had a wide range of uses. For example Scirpus and Typha could be utilized for their greens from young shoots, starchy rhizomes, dry seeds and manufacture uses. As a result the exploitation of the resource base could focus on a single desirable product in some plants or on several products in others.

The plant communities with the highest numbers of useful plants listed in Table 1 are Cottonwood Forest, Andropogon scoparius Prairie (116 taxa each) and Mixed-grass Prairie (111 taxa). Fairly high numbers are also present in Wet Meadow (89), Hardwood Draw (89), Badlands (72), Mesic Forest

Table 1. List of Potential Plant Resources.

	Uses:												**Community occurrence:									
Taxa	Greens	Underground	Fleshy Fruits	Nonfleshy Fruits	Beverage	Flavoring	Emergency	Medicinal	Manufacture	Construction	Miscellaneous*	References	Mixed Grass Prairie	Badlands	Andropogon scoparius	Hardwood Draw	Sand Dune	Marsh	Lacustrine	Cottonwood Forest	Mesic Forest	Wet Meadow
Acer negundo - Box elder										X	c	G,H,R				1					1	
Achillea millefolium - Yarrow					X			X				GR,HG,R,V	1		1	1				1		
Agastache foeniculaceum -					X	X						G,R				1				1	1	
Agropyron (2 spp.) - Wheatgrass	X	X		X								H,R	2		2					2		
Alisma (2 spp.) - Water plantain		X										R						2				
Allium (2 spp.) - Wild Onion		X										G,H,R	1	1	1							
Ambrosia (3 spp.) - Ragweed								X				GR,R	2		1		2			3		1
Amaranthus (3 spp.) - Pigweed	X			X								H,M,R		3			3					
Amelanchier alnifolia Juneberry			X						X			G,GR,H,HG,M,R,S,Y				1				1	1	
Amorpha canescens - Leadplant					X			X			a	G,R,Y			1							
A. fruticosa - False indigo									X			R								1		
Amphicarpa bracteata - Hog peanut		X		X								G,M,R				1				1		
Andropogon gerardi - Big bluestem								X		X		G,R			1					1		
A. scoparius - Little bluestem									X			R			1					1		
Anemone (4 spp.) - Windflower								X				G,R,V	3		2	2				2	2	1
Antennaria (4 spp.) - Pussytoes								X			b	R	2		2	2				4	2	
Apocynum (3 spp.) - Indian hemp								X	X			R,V				3				3	3	2
Aquilegia canadensis - Wild columbine					X						e	G,R	1							1	1	
Arnica fulgens - Arnica								X				V	1		1							
Artemisia (7 spp.) - Wormwood, sage				X		X		X	X		d	G,GR,HG,R,S,V Y	3	4	2	1	2			4	1	1
Asclepias (3 spp.) - Milkweed	X			X				X				G,GR,H,R,V	1		2	2				2	1	1
Aster (9 spp.) - Aster	X											R	3		5	3				4	1	3
Astragalus adsurgens - Milkvetch								X				GR	1	1								
A. canadensis - Canada milkvetch		X						X			d	G,HG,R								1		1
A. crassicarpus - Ground plum				X				X				G,M,R,Y	1		1							
Atriplex (5 spp.) - Saltbush, silverscale	X			X								H,R,S		5								
Beckmannia syzigachne - Sloughgrass	X			X								R					1					1
Bidens (3 spp.) - Beggar's sticks	X											R					3			3		3
Castilleja sessiliflora - Indian paintbrush												R	1		1							
Carex (28 spp.) - Sedge	X			X					X			R,Y	7	6	7	7	5	3		5	6	16
Celtis occidentalis - Hackberry				X		X				X		G,M,R								1	1	
Cerastium (3 spp.) - Chickweed	X											R	3		3	3				3		
Chenopodium (7 spp.) - Goosefoot	X			X								G,H,R,S	5	5			2					
Cirsium (2 spp.) - Thistle	X	X		X								H,R,Y	2		2					2		
Clematis ligusticifolia - Virgin's bower								X				R				1				1		1

Table 1 continued

Taxa	Greens	Underground	Fleshy Fruits	Nonfleshy Fruits	Beverage	Flavoring	Emergency	Medicinal	Manufacture	Construction	Miscellaneous*	References	Mixed Grass Prairie	Badlands	Andropogon scoparius	Hardwood Draw	Sand Dune	Marsh	Lacustrine	Cottonwood Forest	Mesic Forest	Wet Meadow
Cleome serrulata - Beeplant	X			X								H,R					1			1		
Cornus stolonifera - Red osier dogwood			X					X			a	G,GR,H,R,V				1				1	1	1
Coryphantha vivipara - Ball cactus			X									HG	1		1							
Crataegus chrysocarpa - Hawthorn			X									G,R				1				1	1	
Cymopterus acaulis - Biscuitroot	X	X				X						H,Y	1	1								
Cyperus (4 spp.) - Nutsedge	X	X										H					4			4		
Descurainia pinnata - Tansy mustard	X			X								H,S	1	1	1		1			1		
Echinacea angustifolia - Coneflower								X				G,GR,R,V	1		1							
Echinochloa muricata - Barnyard grass				X								H,Y					1			1		
Eleocharis (5 spp.) - Spikerush				X					X			GR,S						5				5
Elymus canadensis - Canada wild rye				X								Y			1					1		
Epilobium (2 spp.) - Willow herb	X											H			2		2					2
Equisetum (4 spp.) - Horsetail	X				X		X		X			G,H,R,Y					4					
Erigeron (2 spp.) - Fleabane								X				V										
Eriogonum (3 spp.) - Wild buckwheat	X							X	X			R		3								
Fragaria (2 spp.) - Wild strawberry			X		X							G,H,M,R				2				2	2	
Fraxinus pennsylvanicus - Green ash				X					X	X	c	G,R				1					1	
Fritillaria atropurpurea - Fritillaria		X						X				R	1	1	1							
Galium (3 spp.) - Bedstraw	X				X			X			e	G,R			1	3					3	3
Geum triflorum - Prairie smoke					X							Y	1		1							
Glyceria (2 spp.) Mannagrass	X			X								R										2
Glycyrrhiza lepidota - Wild liccorice	X	X						X				G,GR,M,R				1				1	1	1
Grindelia squarrosa - Gumweed					X			X			b	G,R,V	1	1	1		1					
Gutierrezia sarothrae - Snakeweed								X				R	1	1								
Hedeoma (2 spp.) - Pennyroyal					X	X		X				G,R,V,Y	1	1						1		
Helianthus (5 spp.) - Wild sunflower				X		X						G,H,M,R	3	2	3	3	2			3		3
H. tuberosus - Jerusalem artichoke		X		X		X						G,GR,H,M,R			1					1		1
Heracleum sphondylium Cow parsnip	X	X										H,R				1					1	1
Heuchera richardsonii - Alumroot								X				R			1							
Hordeum jubatum - Bottlebrush squirreltail	X			X								Y		1								1
Humulus lupulus - Hops	X			X	X			X				G,R,V				1				1		
Hydrophyllum virginianum - Waterleaf	X											R				1					1	
Iris missouriensis - Wild iris								X				G,R										1

Table 1 continued

Taxa	Uses: Greens	Underground	Fleshy Fruits	Nonfleshy Fruits	Beverage	Flavoring	Emergency	Medicinal	Manufacture	Construction	Miscellaneous*	References	**Community occurrence: Mixed Grass Prairie	Badlands	Andropogon scoparius	Hardwood Draw	Sand Dune	Marsh	Lacustrine	Cottonwood Forest	Mesic Forest	Wet Meadow
Juncus balticus - Baltic rush		X		X					X		d	GR,S					1					1
Juniperus (3 spp.) - Juniper			X		X	X	X	X		X	d	G,GR,H,R,V	1		1	2				2	1	
Kuhnia eupatorioides - Kuhnia								X				R	1		1					1		
Lactuca (2 spp.) - Wild lettuce	X										b	H,R	2	2	2		2					
Lepidium densiflorum - Pepperweed	X			X		X						R	1	1								
Liatris punctata - Blazing star		X										R	1		1							
Lilium philadelphicum - Wild lily		X										R			1	1						
Linum (2 spp.) - Wild flax						X						G,M,R	2	2	2							
Lithospermum (2 spp.) - Stoneseed		X						X				R	2		2					2		
Lomatium (2 spp.) - Biscuitroot	X	X		X	X						e	G,GR,R	2	2								
Lycopus (2 spp.) - Bugleweed		X						X				R					2			2	2	2
Lygodesmia juncea - Skeletonweed								X			b	G,R	1	1								
Mentha arvensis - Wild mint					X	X		X				G,GR,M,R,S,V				1					1	1
Mentzelia decapetala - Blazingstar				X								R		1								
Mirabilis (2 spp.) - Umbrellawort								X				G,R	2		2		1					
Monarda fistulosa - Bergamot					X	X		X				G,GR,R,V			1	1				1	1	
Monolepis nuttalliana - Povertyweed	X			X								H,R		1								
Musineon divaricatum - Musineon		X										Y		1								
Nuphar luteum - Spadderdock		X		X								G,H,R							1			
Oenothera (4 spp.) - Evening primrose	X	X		X								H,R,S	2	3	2					2		
Onosmodium molle - Marbleseed								X				R			1					1		
Opuntia polyacantha - Plains prickly pear				X		X	X				d	GR,H,M,R	1	1								
Orobanche (2 spp.) - Broomrape	X											M,R,S	2	2	2							
Oryzopsis hymenoides - Indian ricegrass				X								H,M,R,S		1			1			1		
Oxalis (3 spp.) - Wood sorrel	X					X						G,R	3		3	2				2	2	
Panicum (7 spp.) - Panicgrass				X								R	5		6		1			3		
Penstemon (2 spp.) - Beardtongue								X	X			G,R	2		2							
Petalostemon (4 spp.) - Prairie clover					X			X	X		b	G,R	4	2	4							
Phalaris arundinacea - Reed canarygrass	X			X								R						1				1
Phragmites australis Giant reedgrass	X	X		X						X	c	GR,R,S						1				1
Physalis (2 spp.) - Ground cherry			X									G,H,R			2	2				2		
Plantago (3 spp.) - Plantain	X			X								H,R	1	2						2		1
Polygonatum biflorum - Solomon's seal	X	X										R				1					1	
Polygonum (9 spp.) - Smartweed	X			X		X						R	1	1			6	4		1		7

Table 1 continued

Taxa	Uses: Greens	Underground	Fleshy Fruits	Nonfleshy Fruits	Beverage	Flavoring	Emergency	Medicinal	Manufacture	Construction	Miscellaneous*	References	**Community occurrence: Mixed Grass Prairie	Badlands	Andropogon scoparius	Hardwood Draw	Sand Dune	Marsh	Lacustrine	Cottonwood Forest	Mesic Forest	Wet Meadow
Populus deltoides - Cottonwood	X						X	X	X	X		G,R,Y								1		
P. tremuloides - Quaking apsen							X			X	c	Y				1						
Potamogeton (6 spp.) - Pondweed	X	X										H,R						6	6			
Potentilla anserina - Cinquefoil		X										H,M,R					1					1
Prunus (3 spp.) - Chokecherry, plum, etc.			X					X				G,GR,H,M,R,V			1	3				1	1	
Psoralea esculenta - Tipsin, prairie turnip		X										G,GR,H,M,R	1		1							
Quercus macrocarpa - Bur oak				X				X		X		G,H,R				1					1	
Ratibida columnifera - Prairie coneflower					X			X				G,GR,R			1	1				1		
Rhus aromatica - Skunkbush			X								a	GR,H,M,R,S	1	1	1							
Ribes (3 spp.) - Currant, gooseberry			X					X				G,GR,H,M,R,S		1	1	3				3	3	
Rorippa (2 spp.) - Marsh cress	X											R					1					2
Rosa (2 spp.) - Wild rose			X								a	G,H,R		1	2						1	
Rubus (2 spp.) - Raspberry, blackberry	X		X		X			X				G,H,R,V				2					2	
Rumex (6 spp.) - Dock	X			X								H,R					1					5
Sagittaria (2 spp.) - Arrowleaf	X	X										G,GR,H,M,R						2				
Salix (6 spp.) - Willow							X	X	X	X		G,R,V					6			6		
Salvia reflexa - Sage				X	X							R	1		1					1		
Scirpus (7 spp.) - Bulrush	X	X		X					X			G,H,M,R					2	7				2
Scutellaria (2 spp.) - Skullcap								X				V										2
Shepherdia argentea - Buffalo berry			X						X			G,H,M,R,S				1				1		
Silene antirrhina - Catchfly	X											R	1		1					1		
Sium suave - Water parsnip								X				R										1
Smilacina stellata - False solomon's seal	X	X	X									G,H,R				1				1	1	
Smilax herbacea - Carrion flower	X	X	X									H,M,R				1				1	1	
Solanum (2 spp.) - Nightshade			X									H,R	1	1		1					1	
Solidago (6 spp.) - Goldenrod	X			X	X			X				R,S,V	4	2	5	3	1			5		2
Sparganium eurycarpum - Burreed		X										R						1				
Spartina (2 spp.) - Cordgrass									X	X		G,R		1								2
Sphaeralcea coccinea - Globe mallow	X										d	G,GR,R	1		1							
Sporobolus (2 spp.) - Dropseed				X								R	2		2		1			1		
Stachys palustris - Hedge nettle		X		X								R,S				1						1
Stanleya pinnata - Prince's plume	X			X								R,S,Y	1	1								
Stipa (2 spp.) - Needleandthread									X			G	2		2							
Suaeda (2 spp.) - Seablite	X			X					X			R		2								

Table 1 continued

Taxa	Greens	Underground	Fleshy Fruits	Nonfleshy Fruits	Beverage	Flavoring	Emergency	Medicinal	Manufacture	Construction	Miscellaneous*	References
Symphoricarpos occidentalis - Buckbrush			X					X			d	R
Thalictrum (2 spp.) - Meadowrue											e	G,R
Thermopsis rhombifolia - Golden pea	X							X				G
Toxicodendron rydbergii - Poison ivy								X	X			V
Tradescantia (2 spp.) - Spiderwort	X											R
Typha (2 spp.) - Cattail	X	X		X				X	X			G,GR,H,M,R,S
Ulmus americana - American elm							X	X	X	X		G,R,V
Urtica dioica - Stinging nettle	X							X	X			G,H,R
Verbena (3 spp.) - Vervain								X				G,R
Veronica (2 spp.) - Speedwell	X											M
Viburnum lentago - Arrowwood			X					X	X			G,H,M,R,V
Vicia americana - Vetch	X			X								R
Viola (4 spp.) - Violet	X				X			X				M,R,Y
Vitis (2 spp.) - Wild grape	X		X									G,GR,H,M,R
Yucca glauca - Yucca	X			X				X	X		e	G,H,M,R
Zizania aquatica - Wild rice				X								G,M,R
Totals	175	55	31	141	40	39	18	111	74	17	48	

Taxa	Mixed Grass Prairie	Badlands	Andropogon scoparius	Hardwood Draw	Sand Dune	Marsh	Lacustrine	Cottonwood Forest	Mesic Forest	Wet Meadow
Symphoricarpos occidentalis - Buckbrush				1				1		1
Thalictrum (2 spp.) - Meadowrue									2	2
Thermopsis rhombifolia - Golden pea		1	1							
Toxicodendron rydbergii - Poison ivy				1				1	1	
Tradescantia (2 spp.) - Spiderwort	2		2					2		
Typha (2 spp.) - Cattail						2				
Ulmus americana - American elm				1					1	
Urtica dioica - Stinging nettle				1				1	1	1
Verbena (3 spp.) - Vervain	2		2	2				2		2
Veronica (2 spp.) - Speedwell					2					2
Viburnum lentago - Arrowwood									1	
Vicia americana - Vetch	1		1	1	1			1	1	
Viola (4 spp.) - Violet	2		2	2					2	
Vitis (2 spp.) - Wild grape				2				2	2	
Yucca glauca - Yucca	1	1	1							
Zizania aquatica - Wild rice						1				
Totals	111	72	116	89	57	35	7	116	64	89

*Miscellaneous, a - smoking material, b - gum, c - sap, d - ceremonial or play, e - cosmetic.

References: G - Gilmore 1919, GR - Grinnell 1923, H - Harrington 1967, HG - Hellson and Gadd 1974, M - Medsger 1966, R - Rogers 1980, S - Steward 1938, V - Vogel 1970, Y - Yanovsky 1936.

**Community occurrence is by number of taxa probably found in each community.

(64) and Sand Dunes (57) while Marsh (35) and Lacustrine (7) have relatively low numbers. This sequence also roughly follows a diminution in areal extent of the communities and could potentially be taken to indicate the relative rank of community importance or utilization in a cultural resource base. Yarnell (1964) believes that the major food categories: greens, underground parts, fleshy fruits and nonfleshy fruits and seeds were the most important to Native Americans. Table 1 lists 259 species in these four categories while Figure 1 illustrates their distribution among the communities.

Although it was stated above that the size of the communities could potentially be taken for cultural importance, Figure 1 shows that communities of lesser areal extent often contain higher numbers of edible plants. For instance, Wet Meadows have the highest numbers of greens and nonfleshy fruits and seeds. Although larger communities such as Mixed-grass Prairie, <u>Andropogon scoparius</u> Prairie and Cottonwood Forest also have large numbers of these. Wet Meadows however have a dense herbaceous vegetation and may be more likely to contain concentrations of these food types. The relatively small size of this community as well as the Badlands community would favor the localization of food resources which would facilitate their exploitation.

The Marsh community contains the highest number of utilized underground plant parts. Some of these include <u>Sagittaria</u>, <u>Scirpus</u> and <u>Typha</u> species which were mentioned above as having numerous uses. Hardwood Draws on the other hand contain the largest number of species with fleshy fruits. The relatively large number of references to these species in Table 1 reflects a highly desirable and utilized resource. Cottonwood Forests and Mesic Forests also have high numbers of fleshy fruit plants, but many of the species are shrubs which probably have a more scattered distribution. In contrast, Hardwood Draws often contain concentrations of these species (see descriptions of communities in Chapter 2) so that we might expect a greater exploitation of Hardwood Draws. As indicated by Table 1, it can be concluded that most habitats in the region contain species which could have been utilized. Information derived from Figure 1 indicates that those of the smaller communities may have actually been more important due to the concentration of resources and consequently could have sustained more intense exploitation. As noted previously, this intensity of exploitation may be reflected archeologically by corresponding higher densities of cultural materials (i.e., when the various plant parts could be harvested).

Another important factor is seasonality of availability. The availability of major plant food categories is presented for each plant community (except Lacustrine) in Figures 2a - i. This is based on the number of taxa which can be potentially havested by month, as judged by personal observations and supplemented by the literature. As such, these graphs may not represent completely accurate dates, but should be taken to reflect more of a general seasonality (e.g., early spring, mid summer, etc).

Examination of the graphs reveals a general pattern of availability. The peak availability of greens is in the spring with the curve usually falling rapidly to very low numbers in the latter part of the season. This is because greens consist primarily of tender young shoots and leaves which later often become fibrous, tough or unpalatable in other ways. These

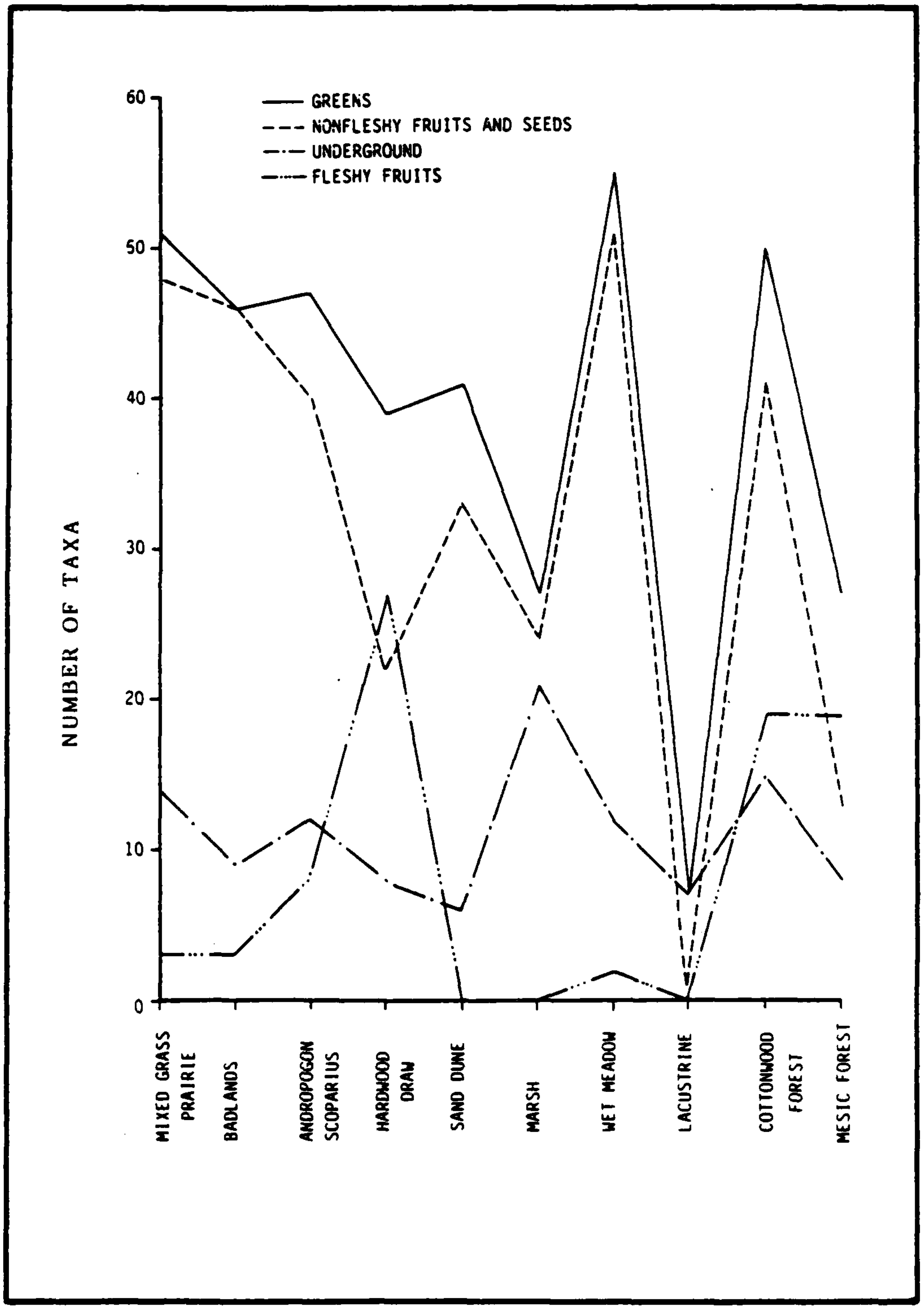

Figure 1. Number of taxa of major plant food categories by community.

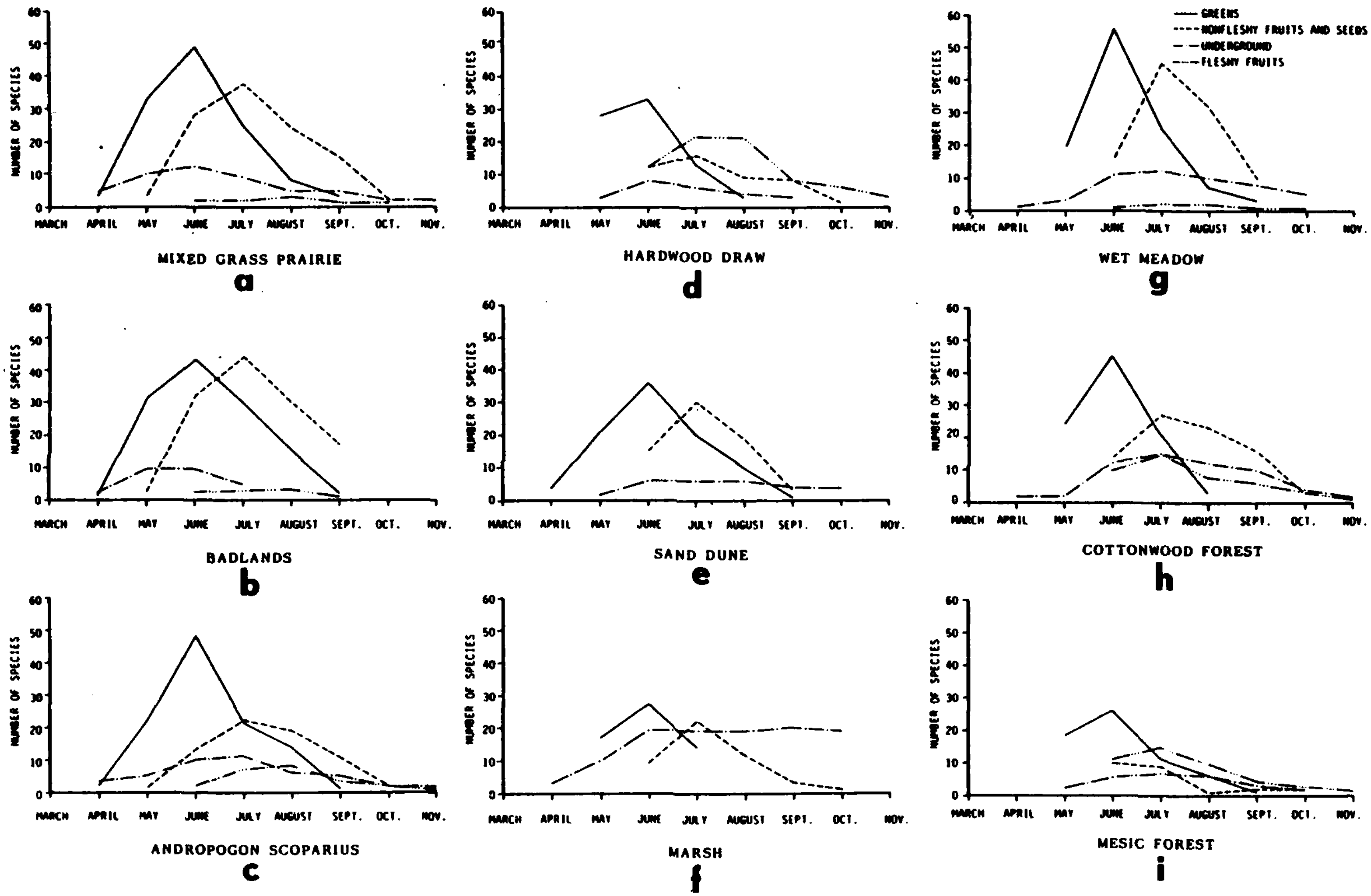

Figure 2. Seasonal availability of major plant food groups by community.

resources would be expected to be most utilized in the spring, not only because they become available then but this would also be a time when stored winter food supplies were being depleted. The availability of greens in the Badland community (Figure 2b) does not drop as rapidly from the early season peak, so exploitation of greens there could be extended.

The number of species with nonfleshy fruits and seeds generally reaches a peak in July with some species extending into September and October. This should be expected since the plants have to flower, set fruit and mature before they can be harvested. Steward (1938:20) states that many plant products in the Great Basin are available for only a short time (e.g., from when seeds mature to time of dispersal) which can be seen in the rather narrow peaks of availability in greens and nonfleshy fruits and seeds in Figure 2. However by exploiting a variety of species and habitats allows the harvesting period can be extended from April to November.

The availability curves for fleshy fruits are either rather flat, due to a small number of species or else have a rather broad peak in mid summer when most species become mature (see e.g., Figure 2d). Once mature the fruits of many species tend to remain on the parent plant (mostly shrubs), for a longer time than dry fruits and seeds. This fact, as well as a variety of species maturing at slightly different times in the latter part of the season, helps to broaden the curve and extend availability.

The curves for underground plant parts are also rather flat. Mixed-grass Prairie, Badlands and <u>Andropogon scoparius</u> Prairie communities (Figures 2a, b, and c) have a slight, broad peak in late spring or early summer, while in Marsh (Figure 2f) it rises quickly in the early season to a flat curve from late spring onward. While most underground parts could be available year-round they have to be located when the above-ground parts are present. In the upland communities these plants include <u>Lomatium</u> and <u>Cymopterus</u> (biscuitroots), <u>Allium</u> (wild onion) and <u>Psoralea</u> (prairie turnip) which have either a edible root or a bulb. These plants grow and flower primarily from early to late spring. Once the flowering and fruit set is complete the above ground parts dry up or decay and blow away. As a result, these plants can only be located during a brief period of time. In Marsh or Wet Meadow, however, most of the plants flower and set fruit in the latter part of the season with the underground parts consisting of rhizomes. Once new vegetative growth is initiated in the spring, the above ground parts usually remain attached for a longer or indefinite period. Thus a steep early season curve reflects the appearance of locating evidence which is followed by a relatively flat curve reflecting their extended availability.

The remainder of the text summarizes and integrates the previous information in order to interpret probable exploitation of the plant communities of the Middle Missouri and suggests possible interpretations or predictions about archaeological site locations, seasonality and cultural use of the communities. In many cases these represent hypotheses which can be tested.

The uplands Hardwood Draws contain a high number of fleshy fruits (Figure 1) that are often locally concentrated and were highly desired historically (Table 1). These are available mostly from mid summer to early autumn (Figure 2d). This community should be specifically exploited

then, in the latter half of the season.

Also in the uplands, the Badland community contains a high number of greens available mostly in spring, a fair number of underground plant parts would be available by then with a high number of nonfleshy fruits and seeds available from early to late summer (Figures 1 and 2b). While this community is normally sparsely vegetated this could in fact facilitate locating or collecting the resource. Since many of the utilized plants are annuals (e.g., Chenopodium and some Atriplex species), the open nature of the Badlands may promote greater abundance of these particular species. Furthermore, many species, such as Lomatium, Cymopterus, and Atriplex, are most abundant on clay soils and so they might be expected to be more prevalent in the Badland community than elsewhere.

The two upland grassland communities, Mixed-grass Prairie and Andropogon scoparius Prairie, have high numbers of species producing greens early in the season at a time when fresh food would be greatly needed (see Figures 1, 2a and 2c). These communites also contain numerous nonfleshy fruits and seeds which could be harvested later in the season. However, many of these plants are usually scattered, especially in the first community. This would require a rather generalized and widespread exploitation of these habitats. Site locations for resource procurement especially on the rolling uplands, therefore might be expected to be distributed randomly, or be more strongly influenced by other factors, such as proximity to resources in Hardwood Draws or Badlands, protection from the elements, nearness of water, hunting needs, etc.

There are also a variety of plants with edible underground parts available (Figure 1). Several of these are available earlier in the season (Figures 2a and c) than similar plants in, for instance, the Marsh community (Figure 2f). One of these is the highly esteemed Psoralea esculenta (prairie turnip or tipsin, see references in Table 1, also Gilmore 1919). This was assigned to both communities but is probably more abundant in Andropogon scoparius Prairie. Along the Missouri, this plant tends to occur on hillsides with rocky or gravelly soil which usually support Andropogon scoparius Prairie. However on hillsides at distances away from the River the prairie turnips might be expected to occur within the Mixed-grass Prairie community. Fires were probably more frequent here prior to fire suppression activities which may have also enhanced the establishment of this plant (Herman-Parker 1978).

Although the lowland Marsh community contains only a relatively small number of useful plants, (Table 1) it actually contains the highest number of plants with edible underground parts (Figure 1). These plants are high in carbohydrates and can be dried and stored for winter use and nearly all are available and identifiable from about early summer to autumn (Figure 2f). This differs with underground plant parts in upland communities because the above surface portion of the plant quickly disappears. In addition many of these plants have several uses including manufacturing and the collection of greens or young shoots in spring (Table 1, Figure 2f). Several of the species have been widely utilized historically (Table 1). Many of the taxa, for example Typha (cattail) form dense patches, allowing for efficient exploitation. In general, this community contains resources which could be effectively exploited partly in the spring but primarily in the late season.

Usually adjacent to the Marsh is the Wet Meadow community which contains the highest number of greens (available mostly in late spring) as well as nonfleshy fruits and seeds (mostly available in mid summer) of any community in the area (Figure 1 and 2g). A fair amount of underground plant parts are also available from late spring onward (Figure 2g). These products are obtained from species which may form concentrations. Exploitation is also promoted since only a narrow zone is occupied by the Wet Meadow community. Since Wet Meadow and Marsh communities are adjacent, it seems likely that utilization of these two communities would overlap. In the summer dry fruits and seeds could be harvested in Wet Meadows while underground rhizomes were harvested in the Marsh. Greens from each could be gathered at the same time in the spring.

Although use of stems, etc. for food or in manufacture might leave little evidence, a greater proportion of charred seeds and fruits of plants from these communities (e.g., of *Scirpus*, and *Eleocharis*) could be expected to preserve in archeological sites.

The two lowland woodland communities, Cottonwood and Mesic Forests, were probably the primary source of construction materials (Table 1) by Plains Village Indians. Although Cottonwood Forests also have a high number of greens available early (Figures 1 and 2h) and fleshy fruits available late in the season (Figures 1, 2h and 2i), the lack of localization or concentrations would not have favored their utilization. It is likely that these communities were exploited in a general manner or that gathering here was incidental to more the specific exploitation of Marsh and Wet Meadow communities.

The remaining two lowland communities were probably utilized little for food. While Sand Dunes contain a fair number of greens available in spring and nonfleshy fruits and seeds later on (Figures 1 and 2e), many of these are shoreline or sandbar plants which might not attain sufficient concentrations or localization to attract specific exploitation. Because of this they probably would have been harvested incidentally to other activities. The Lacustrine community has only seven useful species (Table 1) which produce edible underground parts through the season, six species of greens available in the spring or one seed species available in the late summer or early fall. Since these plants can also occur in the Marsh community, it may have been easier to exploit them in the latter community rather than in the Lacustrine community.

Based on the previous discussion several predictions can be made concerning the prehistoric utilization of native plant communities along the Missouri Trench. First it is evident that preservation of floral remains is biased in favor of more durable plant parts and therefore the evidence for the utilization of the softer tissues will have to be much more indirect. Such evidence may be inferred from site locations adjacent to or within such productive plant communities. Additional evidence may be obtained from the analysis of a site's artifact assemblage as it could be assumed that the cultural materials, features, etc. resulting from plant procurement should differ from other resource procurement related sites (e.g., hunting).

The density of cultural remains should reflect the intensity of the

plant procurement. One should expect that consistently and highly productive plant locations should result through time in a nearly continuous deposition of cultural materials. The reuse of an area may actually result in a widespread yet diffuse scatters of cultural materials since reoccupations may not be directly on top of one another (cf. Binford 1980; Foley 1981).

Another consideration is site visibility. Sites related to the procurement of plant resources from communities in the uplands above the Missouri Trench should be expected to be the most visible. This is due to the shallowness of the soil and therefore higher surface visibility. Archeological sites occurring the river bottoms have substantially lower visibility due to denser vegetative cover and a lower preservation potential due to floodings and river meandering. In addition as noted previously many of the plant resources within these bottomlands are often scattered therefore indicating that resource procurement related sites should be similarly diffuse. It should also be noted that the Arikara occupied the river bottoms during the winter living in small earthlodge villages (Hurt 1969). The archeological evidence of these villages is rare in comparison to their actual number, especially considering the number of their summer villages on the higher bluffs above the river. These factors in addition to the recent inundation of the Missouri River Trench, indicate that finding a small low density cultural material scatter in the heavily vegetated, un-inundated river bottoms is extremely unlikely.

Another consideration is the particular people's subsistence and settlement strategy. For example, the semisedentary peoples which occupied earthlodge villages could have probably procured a large number of resources within a daily foraging radius from the earthlodge. However when these resources are exhausted or resources become ripe at distances greater than a daily foraging radius then temporary overnight camps would have to be established. Such camps would be expected to function as collecting and processing locales. These sites and their artifact assemblage would of course vary depending on the particular plant product being processed. Since a number of plant products overlap in their availability (see Figure 2), some type of scheduling of procurement would be necessary. Given the documented importance of <u>Psorelea</u> as a food and trade item, one might expect a concerted procurement effort and consequently a higher density of these particular procurement sites.

Additional research questions could be posed and tested based on the data presented above which would add to our knowledge of the prehistoric lifeways of the Middle Missouri subarea. Hopefully the information in this section will aid future researchers in this pursuit and allow for a greater understanding of past human-environment interactions.

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APPENDIX B

LANDFORM ASSOCIATION MAPS

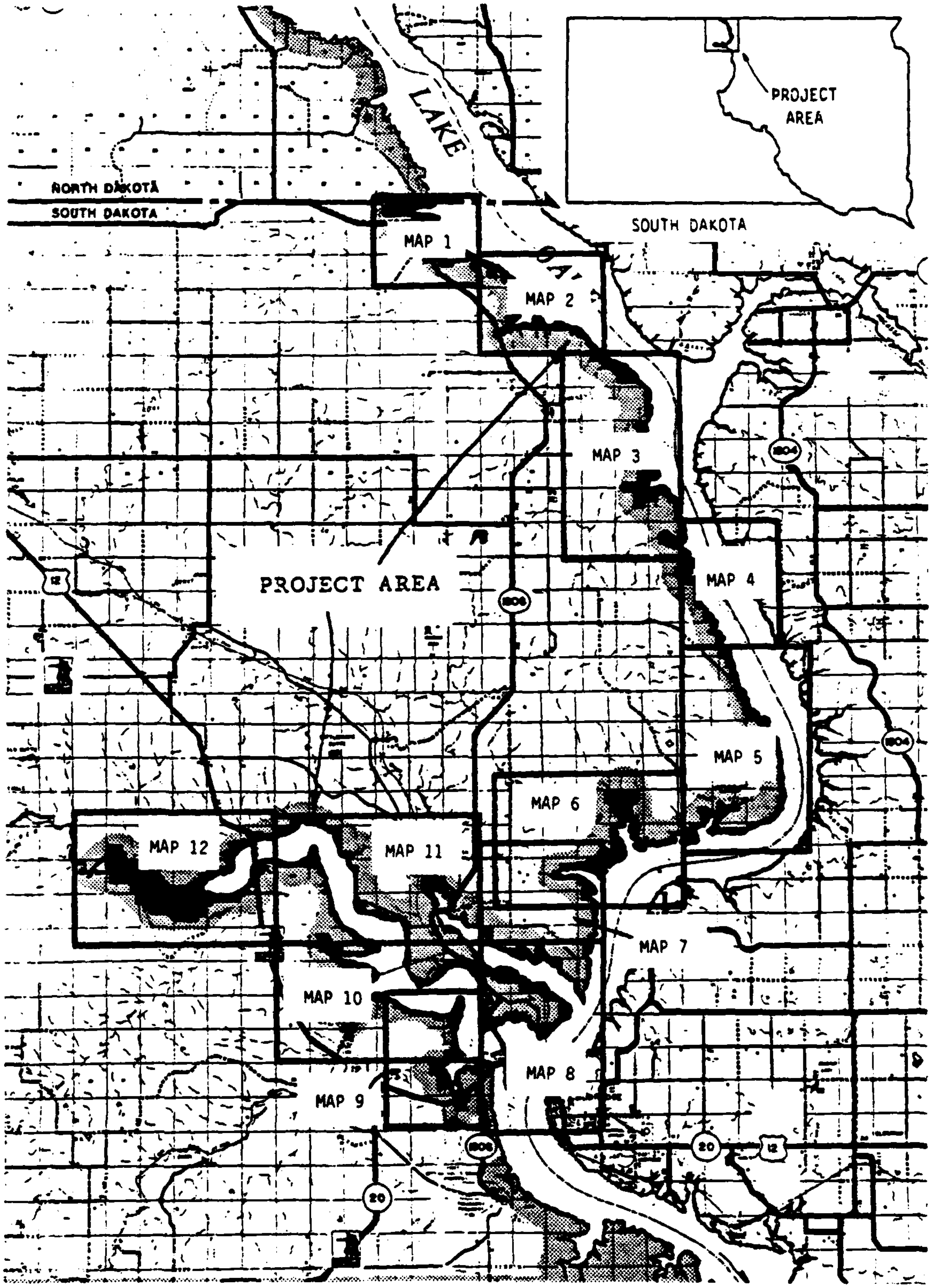
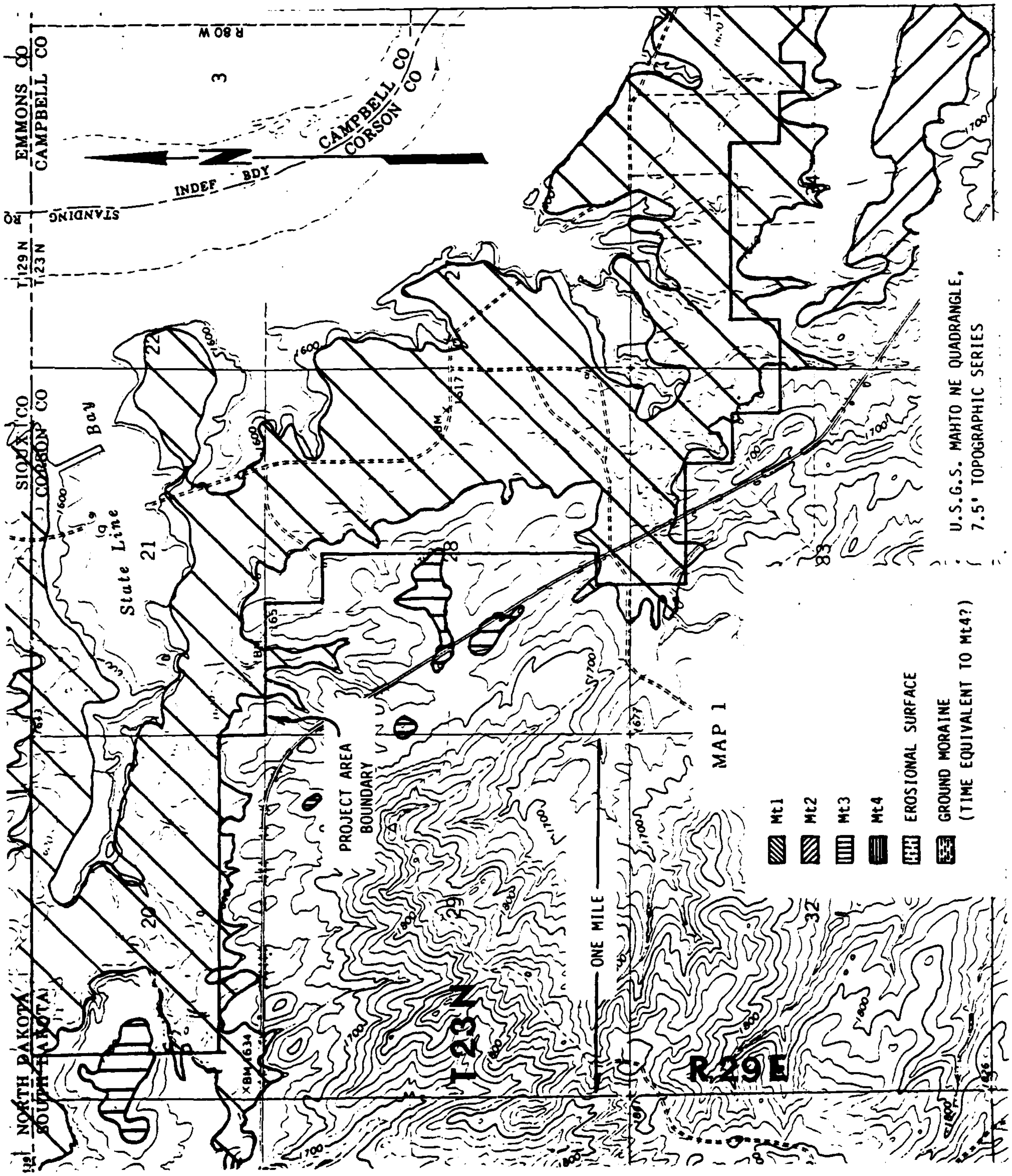
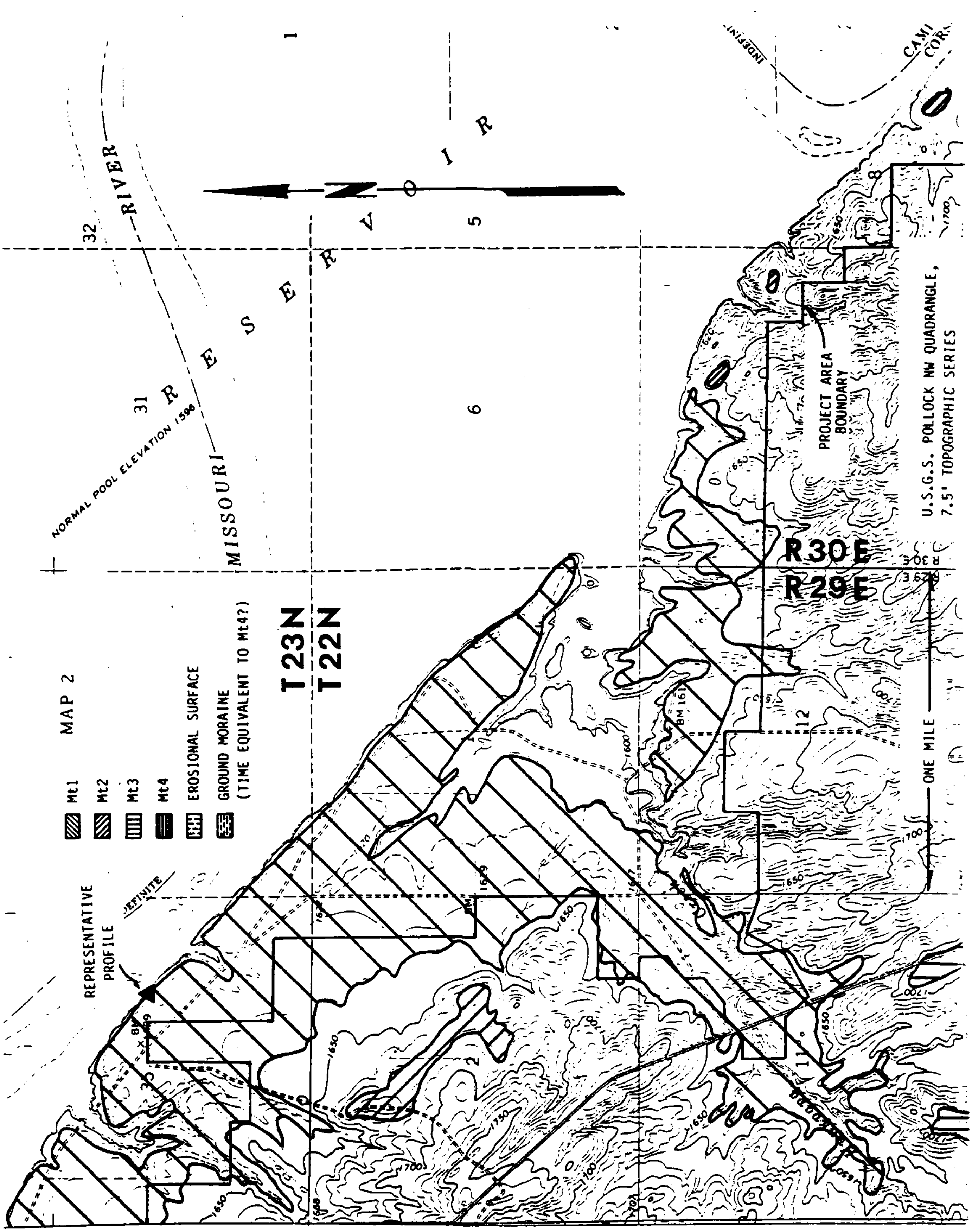
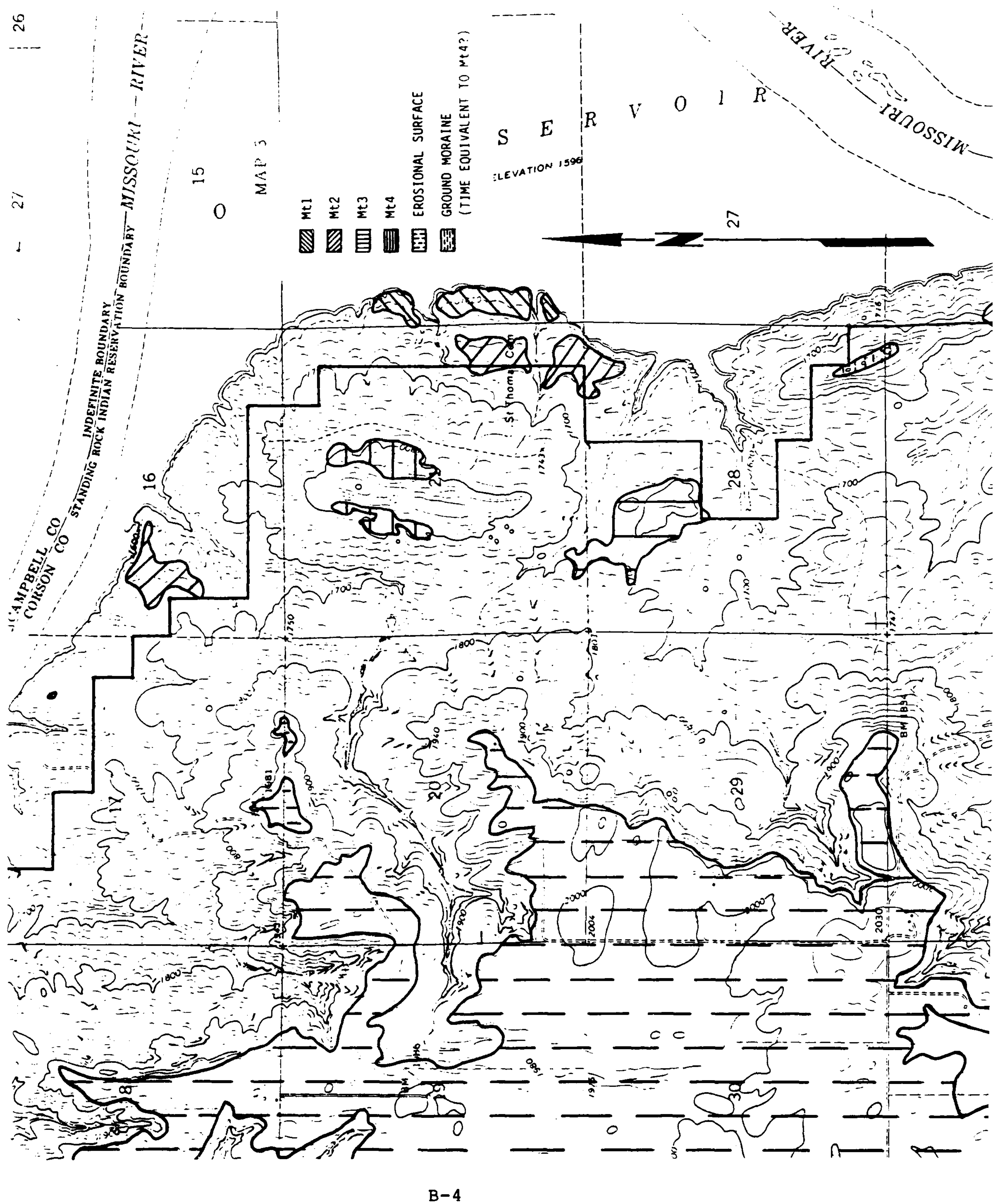
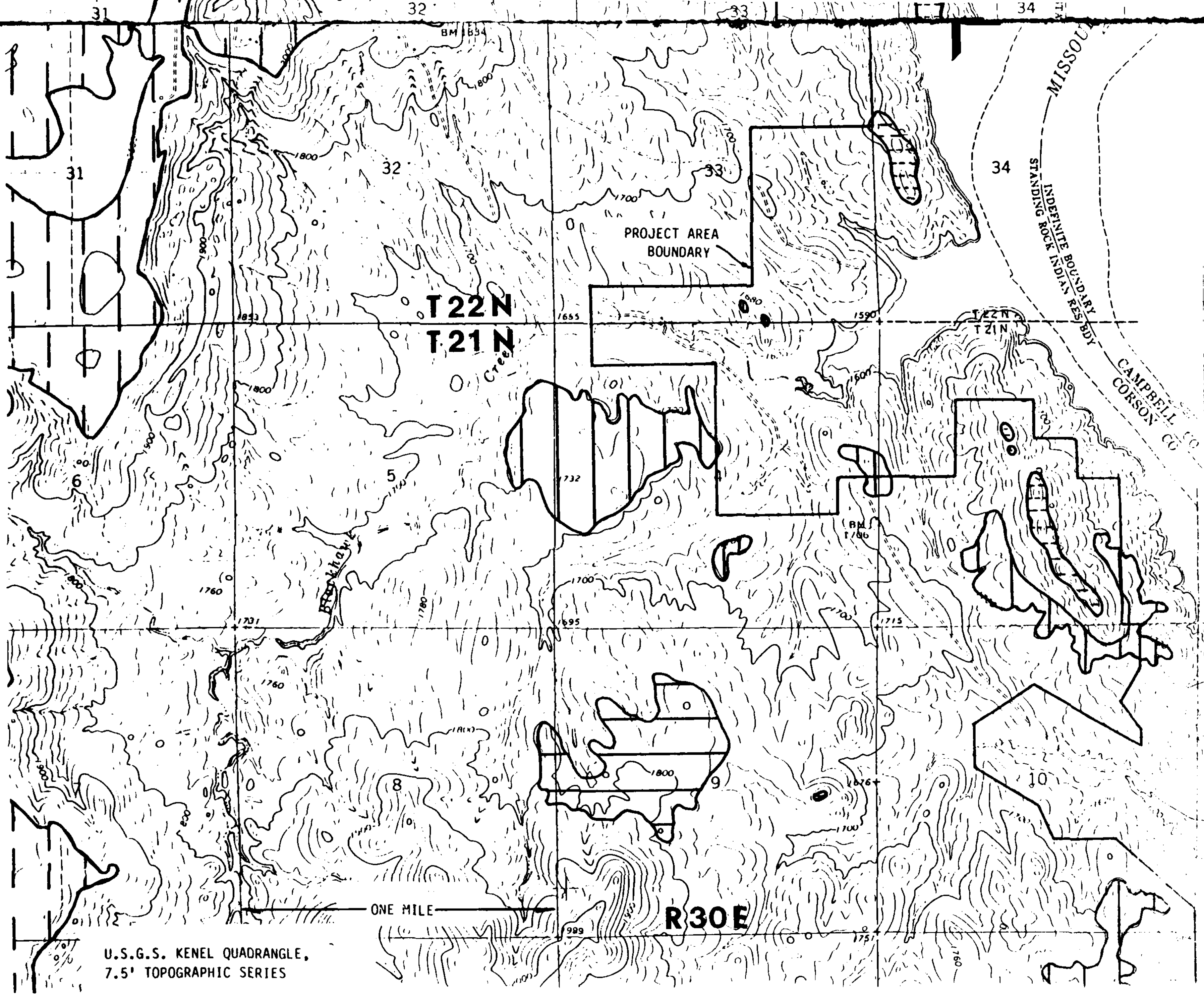


Figure 1. Key to location of landform association maps

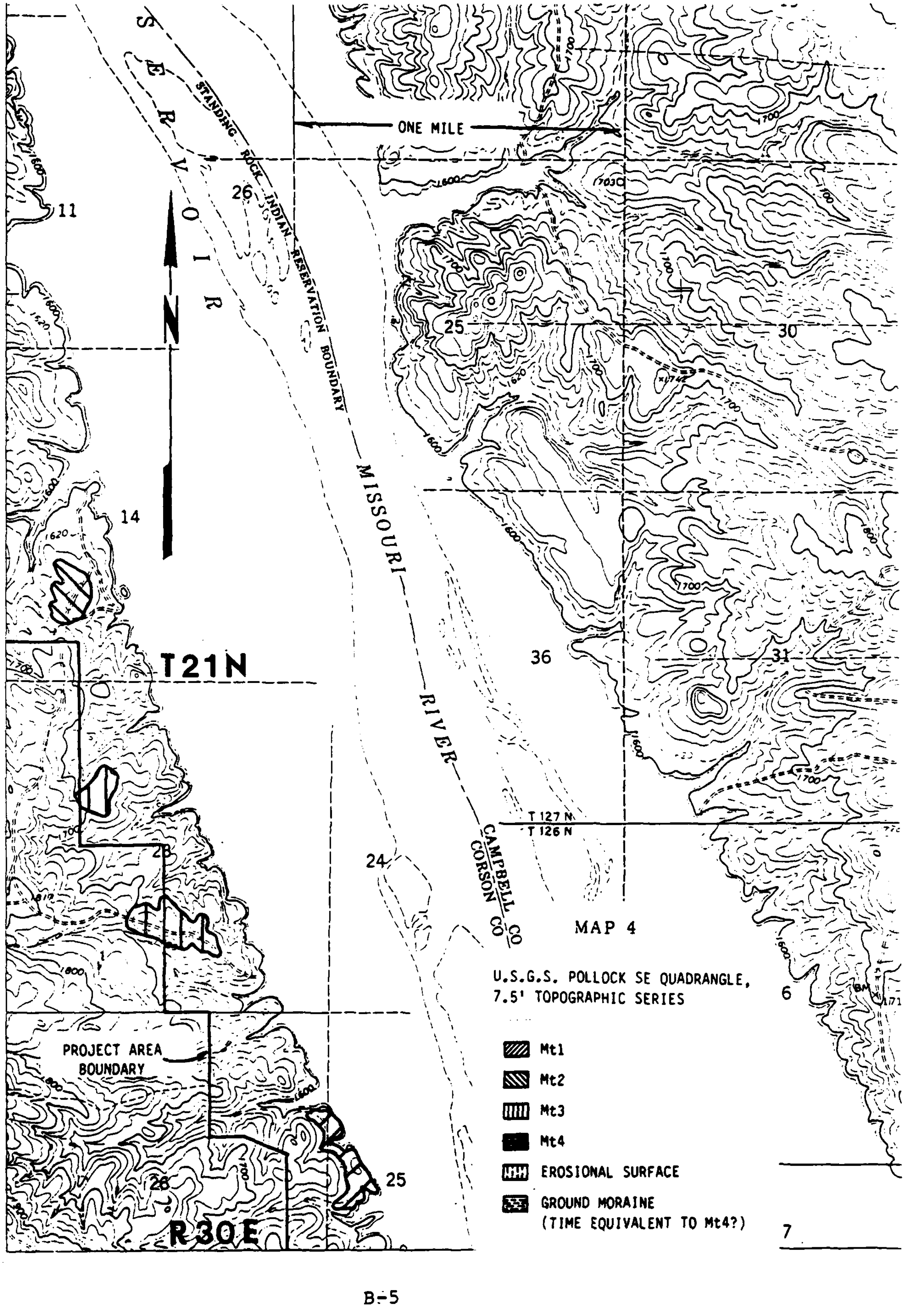

NORTH DAKOTA
SOUTH DAKOTA
EMMONS CO
CAMPBELL CO
SIOUX CO
CORSON CO
CAMPBELL CO
CORSON CO
INDEF BDY
STANDING RO
T.129 N
T.23 N
R 80 W
State Line
Bay
PROJECT AREA
BOUNDARY
ONE MILE
T23N
R29E
MAP 1
Mt1
Mt2
Mt3
Mt4
EROSIONAL SURFACE
GROUND MORAINE
(TIME EQUIVALENT TO Mt4?)
U.S.G.S. MAHTO NE QUADRANGLE,
7.5' TOPOGRAPHIC SERIES


MAP 2
Mt1
Mt2
Mt3
Mt4
EROSIONAL SURFACE
GROUND MORAINE
(TIME EQUIVALENT TO Mt4?)
REPRESENTATIVE PROFILE
DEFINITE
T23N
T22N
R30E
R29E
MISSOURI
RIVER
RESERVOIR
NORMAL POOL ELEVATION 1596
PROJECT AREA BOUNDARY
U.S.G.S. POLLOCK NW QUADRANGLE,
7.5' TOPOGRAPHIC SERIES
ONE MILE


MAP 5
Mt1
Mt2
Mt3
Mt4
EROSIONAL SURFACE
GROUND MORAINE
(TIME EQUIVALENT TO Mt4?)
MISSOURI RIVER
CAMPBELL CO
CORSON CO
STANDING ROCK INDIAN RESERVATION BOUNDARY
INDEFINITE BOUNDARY
ELEVATION 1596



PROJECT AREA BOUNDARY
T22N
T21N
R30E
INDEFINITE BOUNDARY
STANDING ROCK INDIAN RES BDY
CAMPBELL CO
CORSON CO
ONE MILE
U.S.G.S. KENEL QUADRANGLE,
7.5' TOPOGRAPHIC SERIES


ONE MILE
STANDING ROCK INDIAN RESERVATION BOUNDARY
SERVOIR
MISSOURI RIVER
N
T21N
R30E
T 127 N
T 126 N
CAMPBELL CO
CORSON CO
PROJECT AREA BOUNDARY
11
14
26
25
30
36
31
23
24
6
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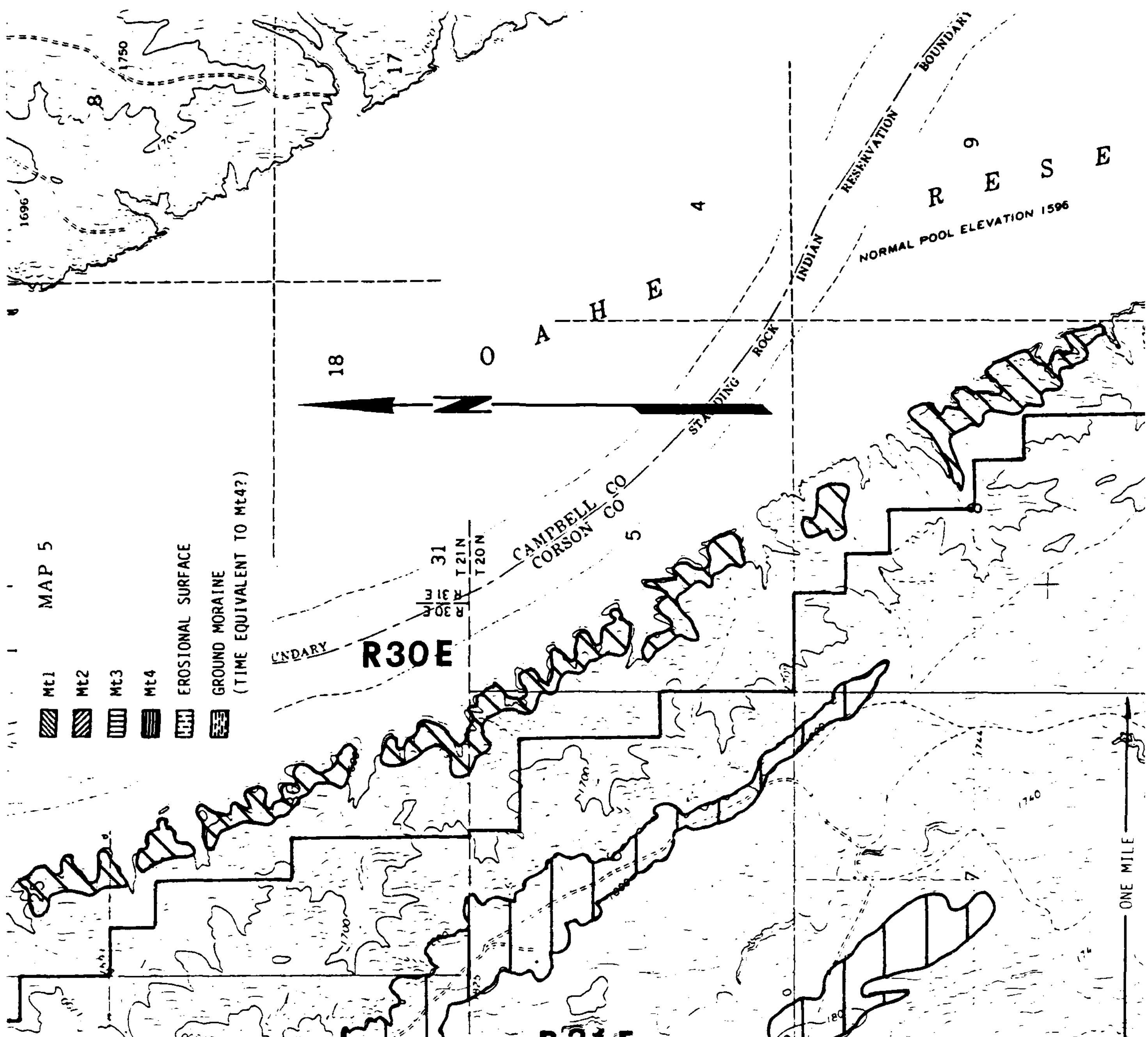
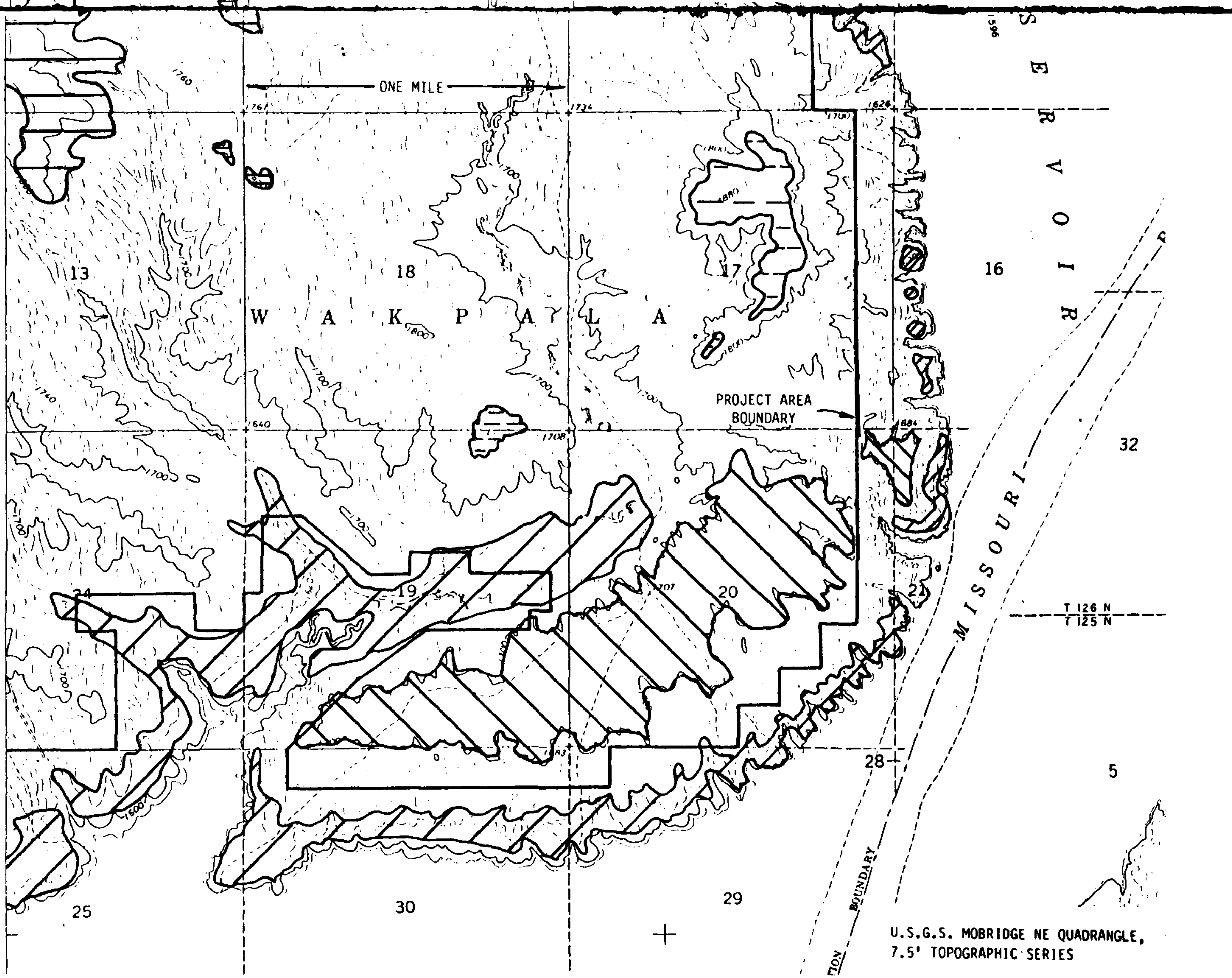
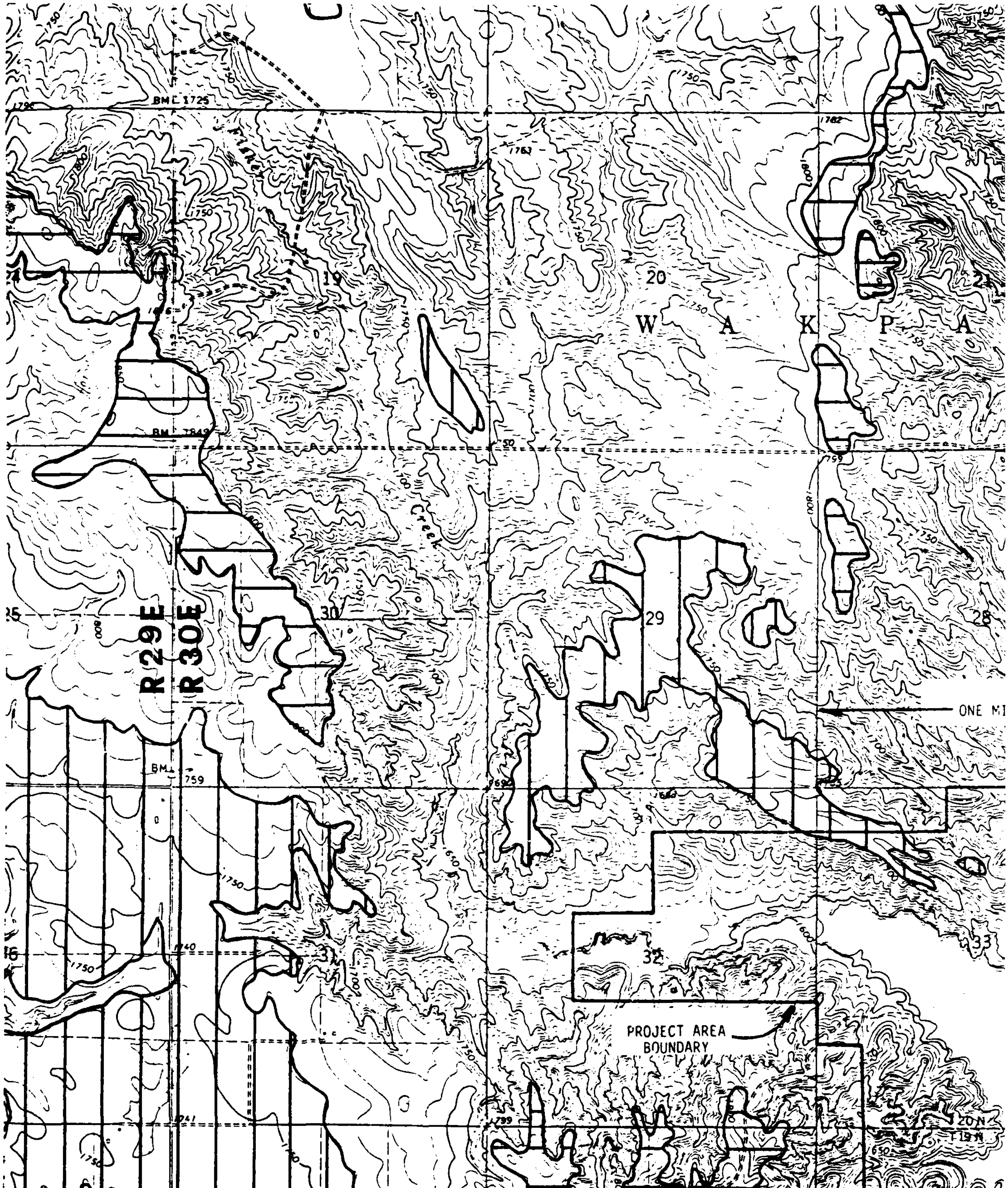
28
1600
1620
1700
MAP 4
U.S.G.S. POLLOCK SE QUADRANGLE,
7.5' TOPOGRAPHIC SERIES
Mt1
Mt2
Mt3
Mt4
EROSIONAL SURFACE
GROUND MORAINE
(TIME EQUIVALENT TO Mt4?)


MAP 5
Mt1
Mt2
Mt3
Mt4
EROSIONAL SURFACE
GROUND MORAINE
(TIME EQUIVALENT TO Mt4?)
O A H E R E S E
NORMAL POOL ELEVATION 1596
STANDING ROCK INDIAN RESERVATION BOUNDARY
CAMPBELL CO
CORSON CO
R30E
R31E
R30E
T21N
T20N
ONE MILE



U.S.G.S. MOBRIDGE NE QUADRANGLE,
7.5' TOPOGRAPHIC SERIES



19
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W A K P A
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32
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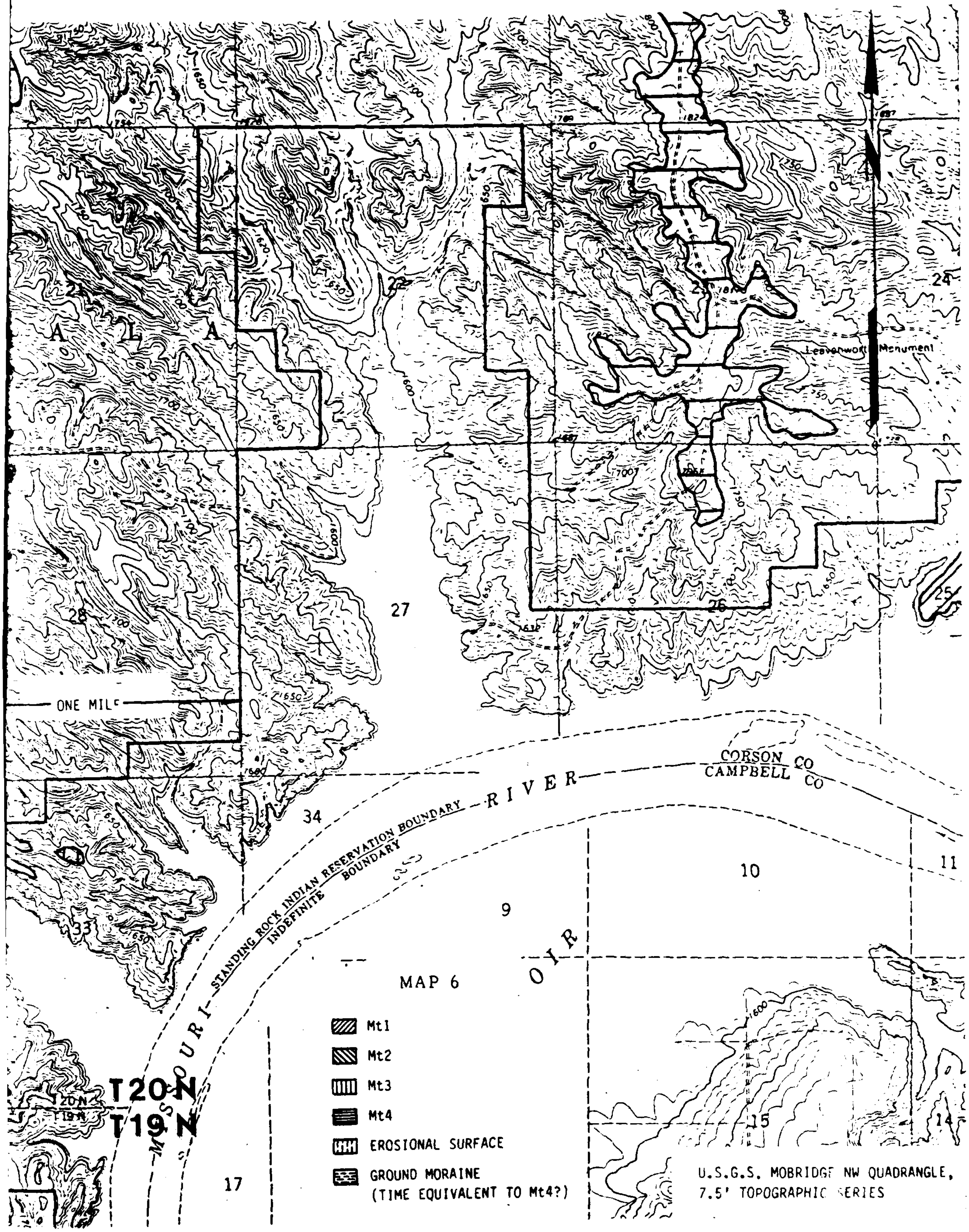
R 29 E
R 30 E
Creek
ONE MI
PROJECT AREA
BOUNDARY



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A L A
Leavenworth Monument
28
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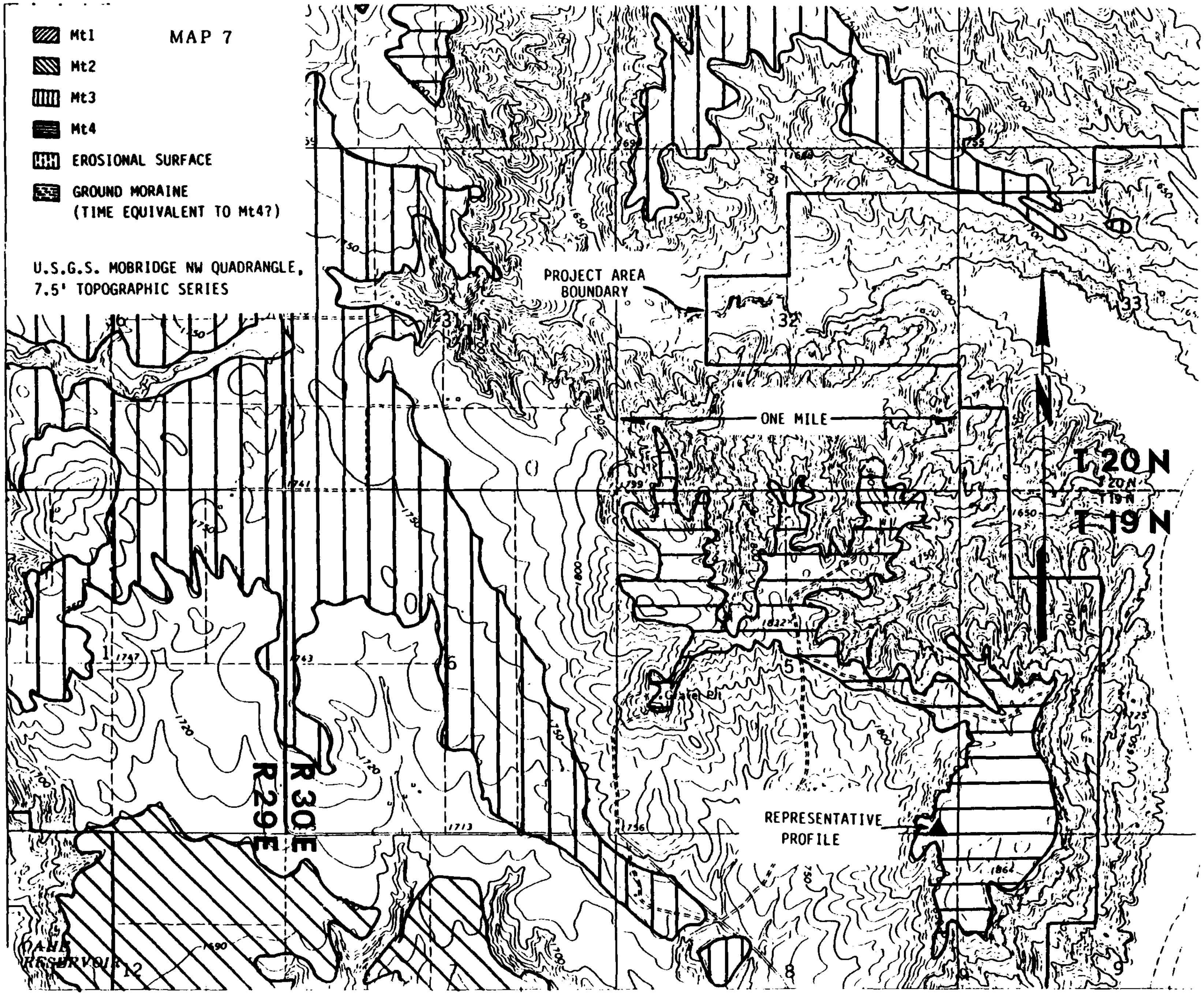
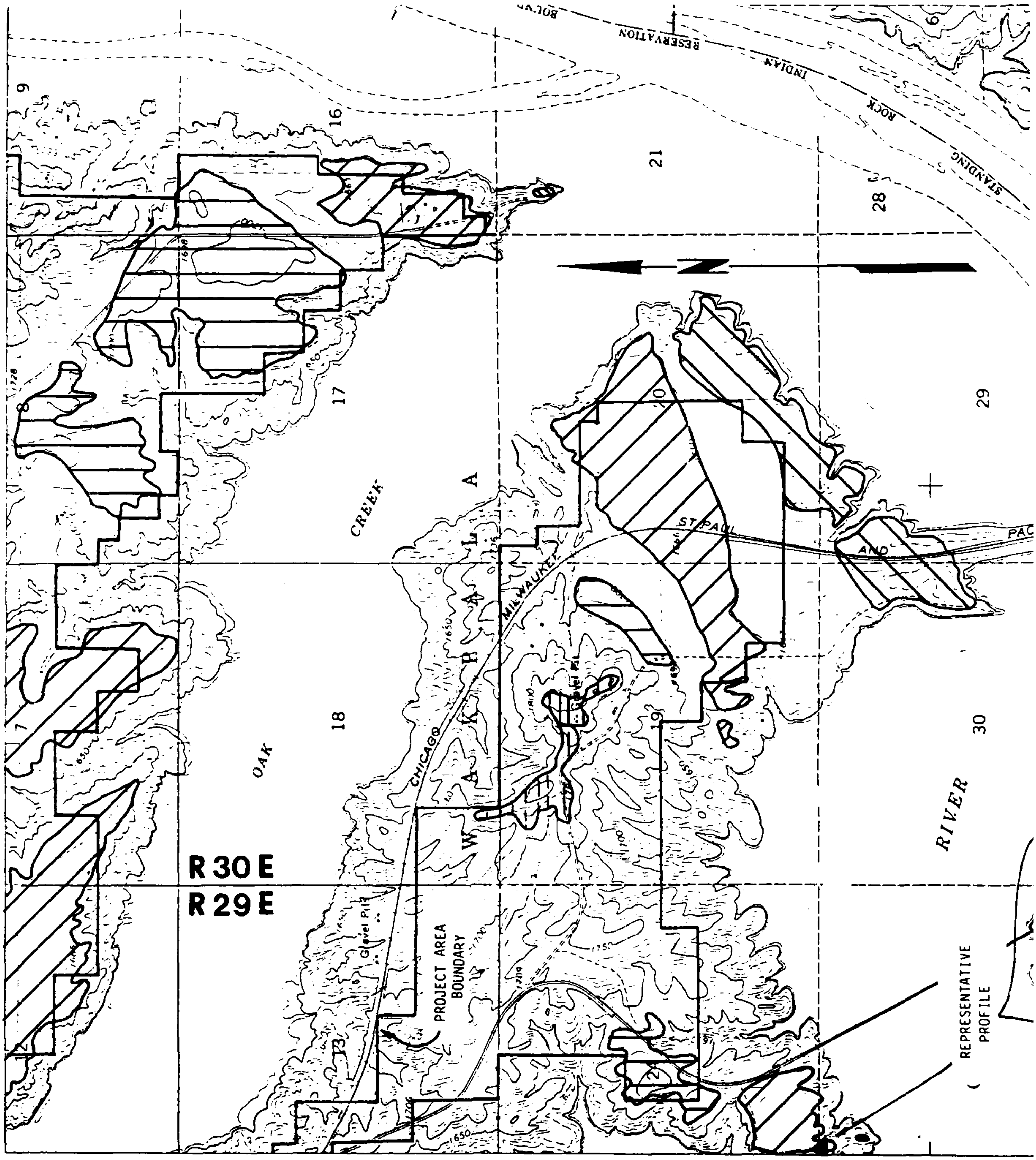
25
ONE MILE
CORSON CO
CAMPBELL CO
RIVER
34
10
11
STANDING ROCK INDIAN RESERVATION BOUNDARY
INDEFINITE BOUNDARY
9
33
MISSOURI
OIR
T20N
T19N
17
15
14
MAP 6
Mt1
Mt2
Mt3
Mt4
EROSIONAL SURFACE
GROUND MORAINE
(TIME EQUIVALENT TO Mt4?)
U.S.G.S. MOBRIDGE NW QUADRANGLE,
7.5' TOPOGRAPHIC SERIES


MAP 7
Mt1
Mt2
Mt3
Mt4
EROSIONAL SURFACE
GROUND MORAINE
(TIME EQUIVALENT TO Mt4?)
U.S.G.S. MOBRIDGE NW QUADRANGLE,
7.5' TOPOGRAPHIC SERIES
PROJECT AREA
BOUNDARY
ONE MILE
T 20 N
T 19 N
R 30 E
R 29 E
REPRESENTATIVE
PROFILE
OAHE
RESERVOIR
Gravel Pit


R30E
R29E
PROJECT AREA BOUNDARY
REPRESENTATIVE PROFILE
OAK
CREEK
RIVER
CHICAGO
MILWAUKEE
ST PAUL
AND
STANDING
ROCK
INDIAN
RESERVATION
Gravel Pit
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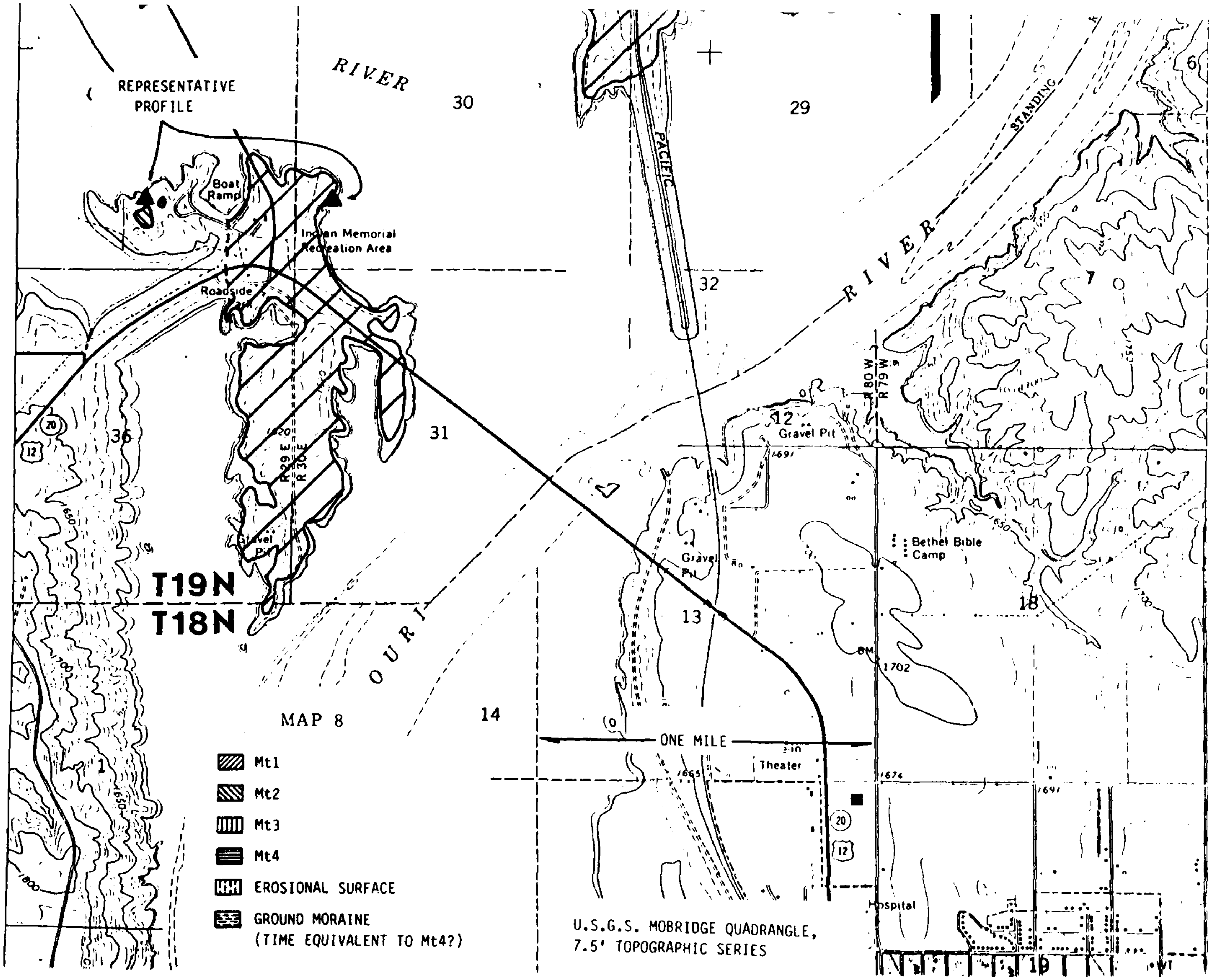
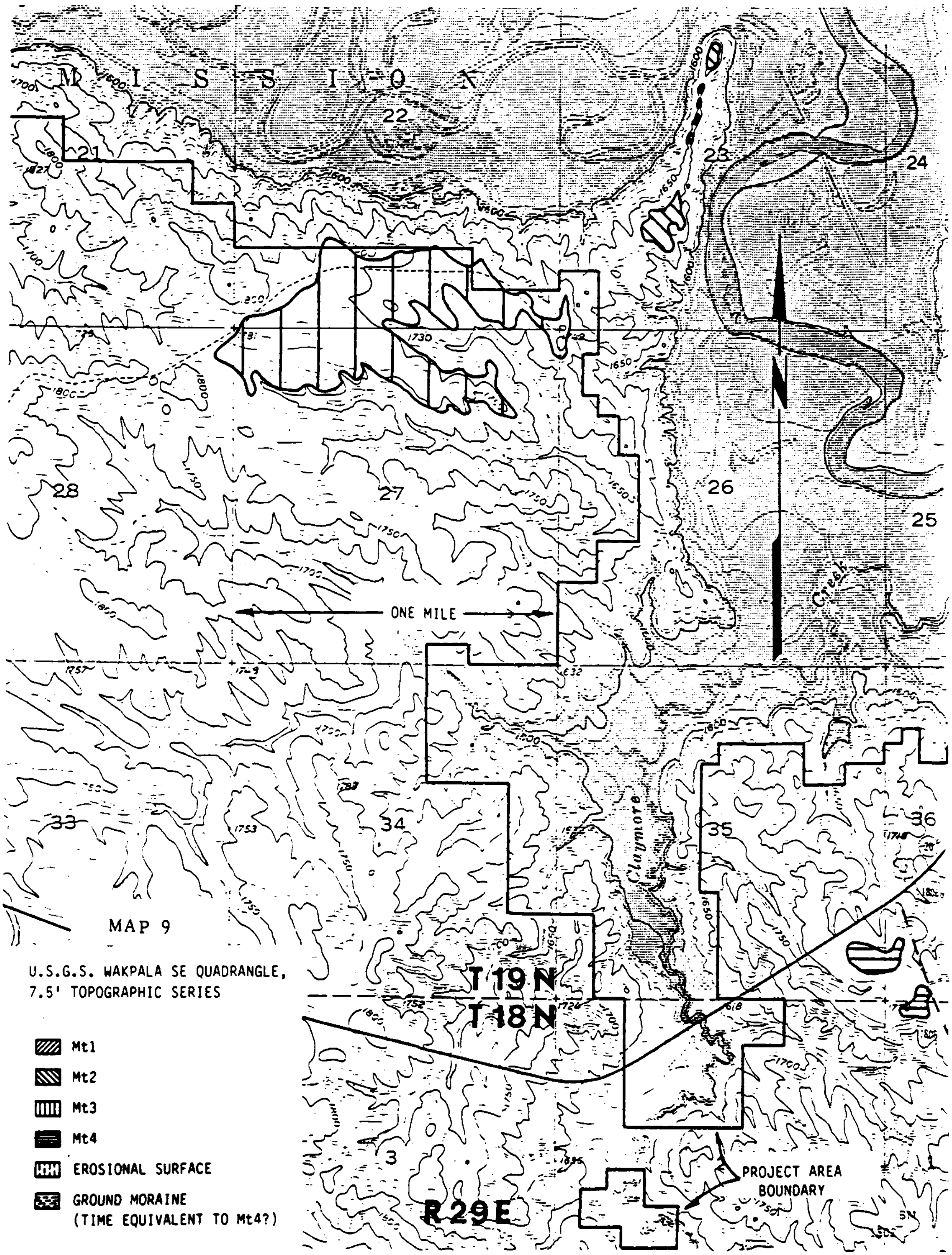


U.S.G.S. MOBRIDGE QUADRANGLE,
7.5' TOPOGRAPHIC SERIES



M I S S I O N
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36
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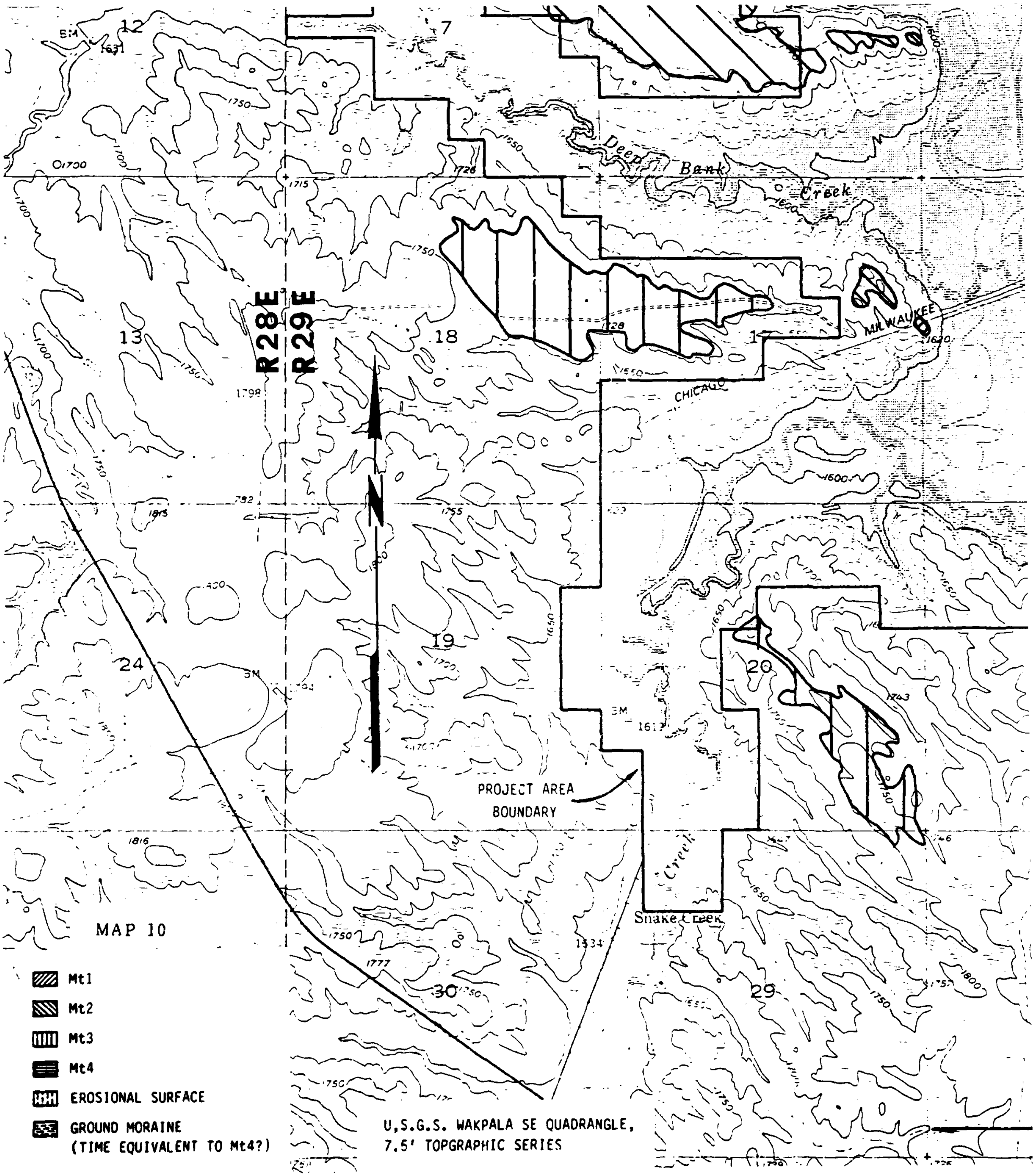
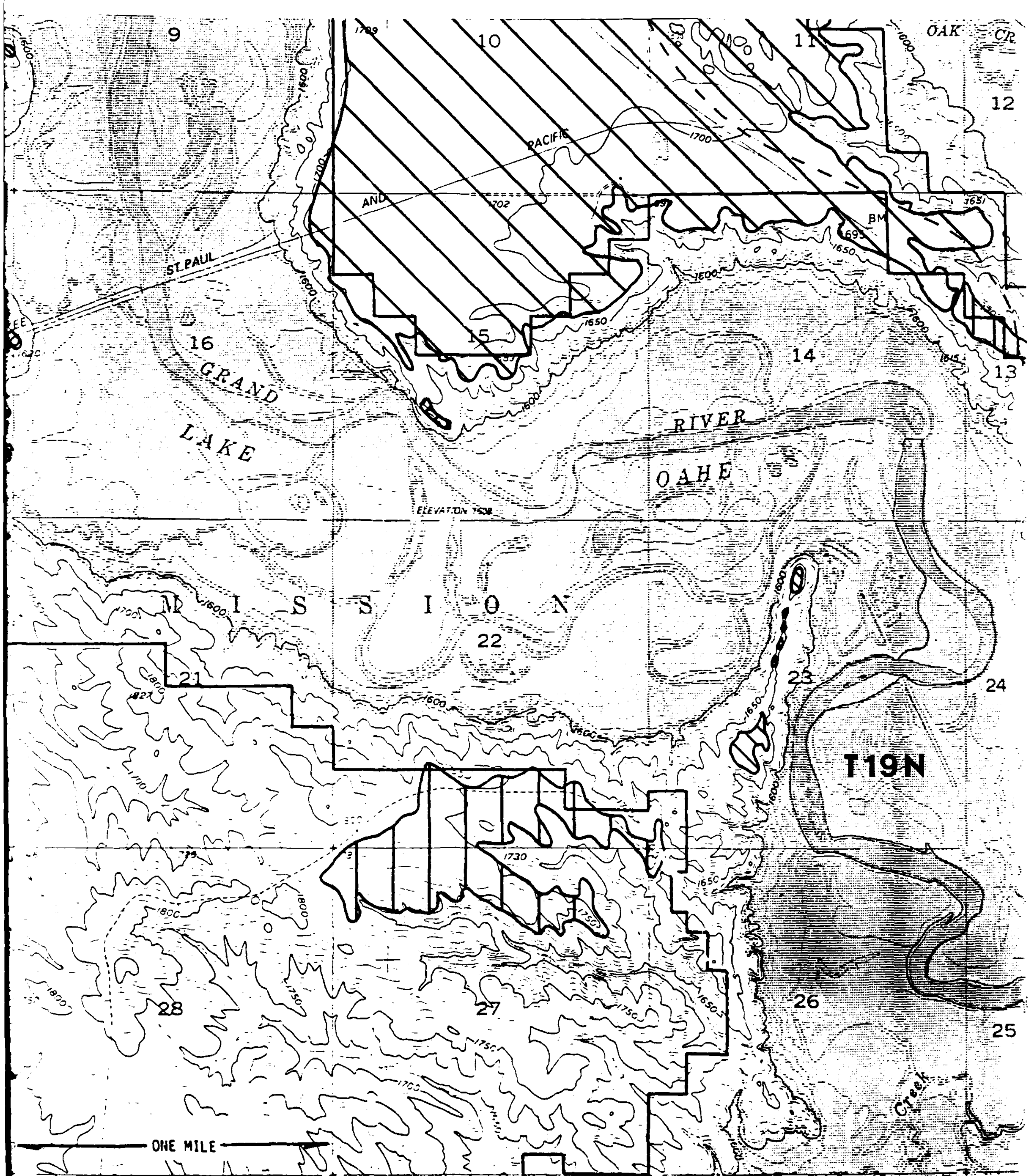
ONE MILE
Claymore
Creek
T19N
T18N
R29E
PROJECT AREA BOUNDARY
MAP 9
U.S.G.S. WAKPALA SE QUADRANGLE,
7.5' TOPOGRAPHIC SERIES
Mt1
Mt2
Mt3
Mt4
EROSIONAL SURFACE
GROUND MORAINE
(TIME EQUIVALENT TO Mt4?)


R28E
R29E
Deep Bank Creek
CHICAGO
MILWAUKEE
PROJECT AREA BOUNDARY
Snake Creek
MAP 10
Mt1
Mt2
Mt3
Mt4
EROSIONAL SURFACE
GROUND MORAINE
(TIME EQUIVALENT TO Mt4?)
U.S.G.S. WAKPALA SE QUADRANGLE,
7.5' TOPGRAPHIC SERIES



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OAK CR
12
PACIFIC
AND
ST. PAUL
16
15
14
13
GRAND
LAKE
RIVER
OAHE
ELEVATION 1608
M I S S I O N
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24
T19N
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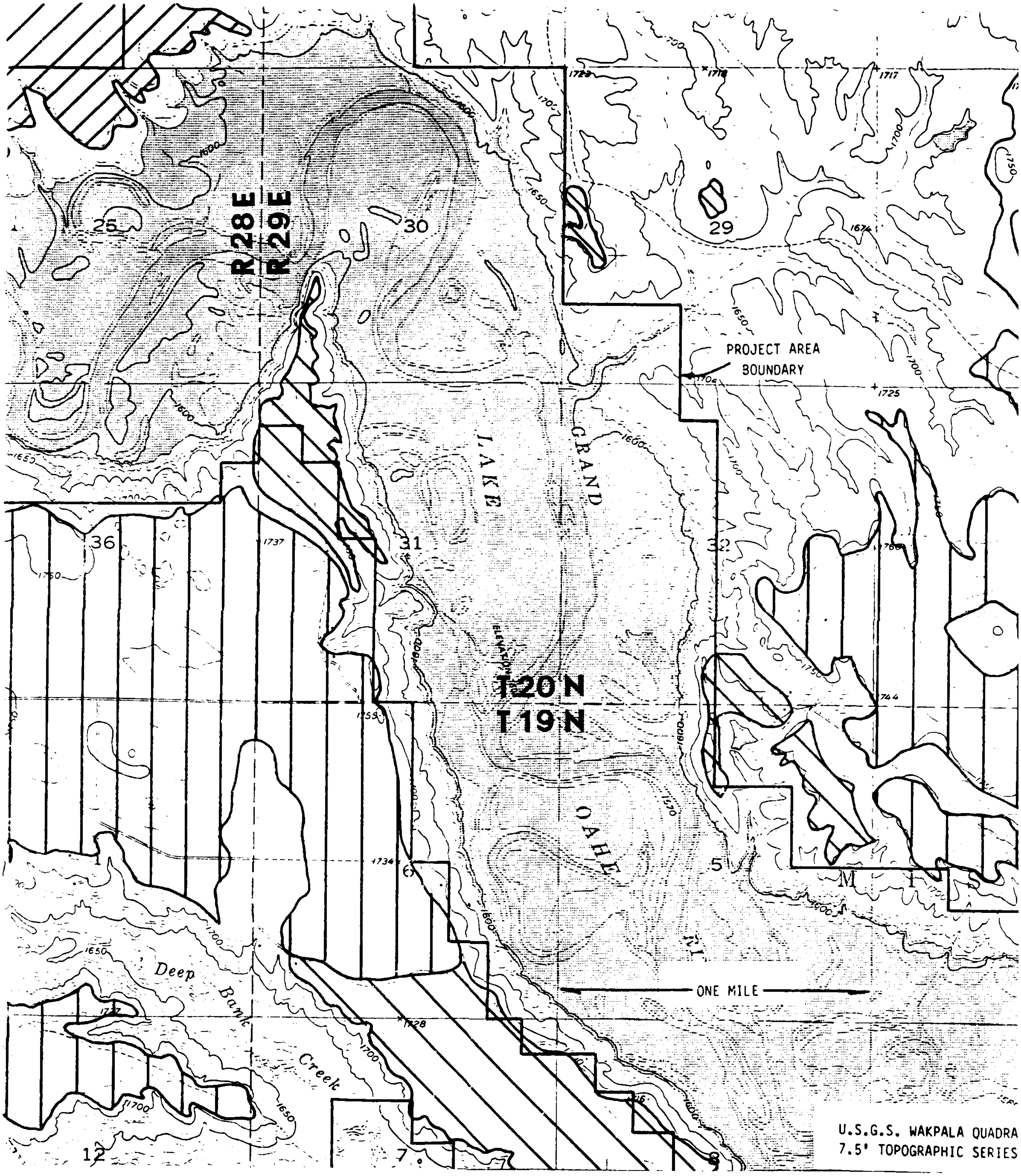
28
27
26
25
Creek
ONE MILE


R28E
R29E
T20N
T19N
25
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29
36
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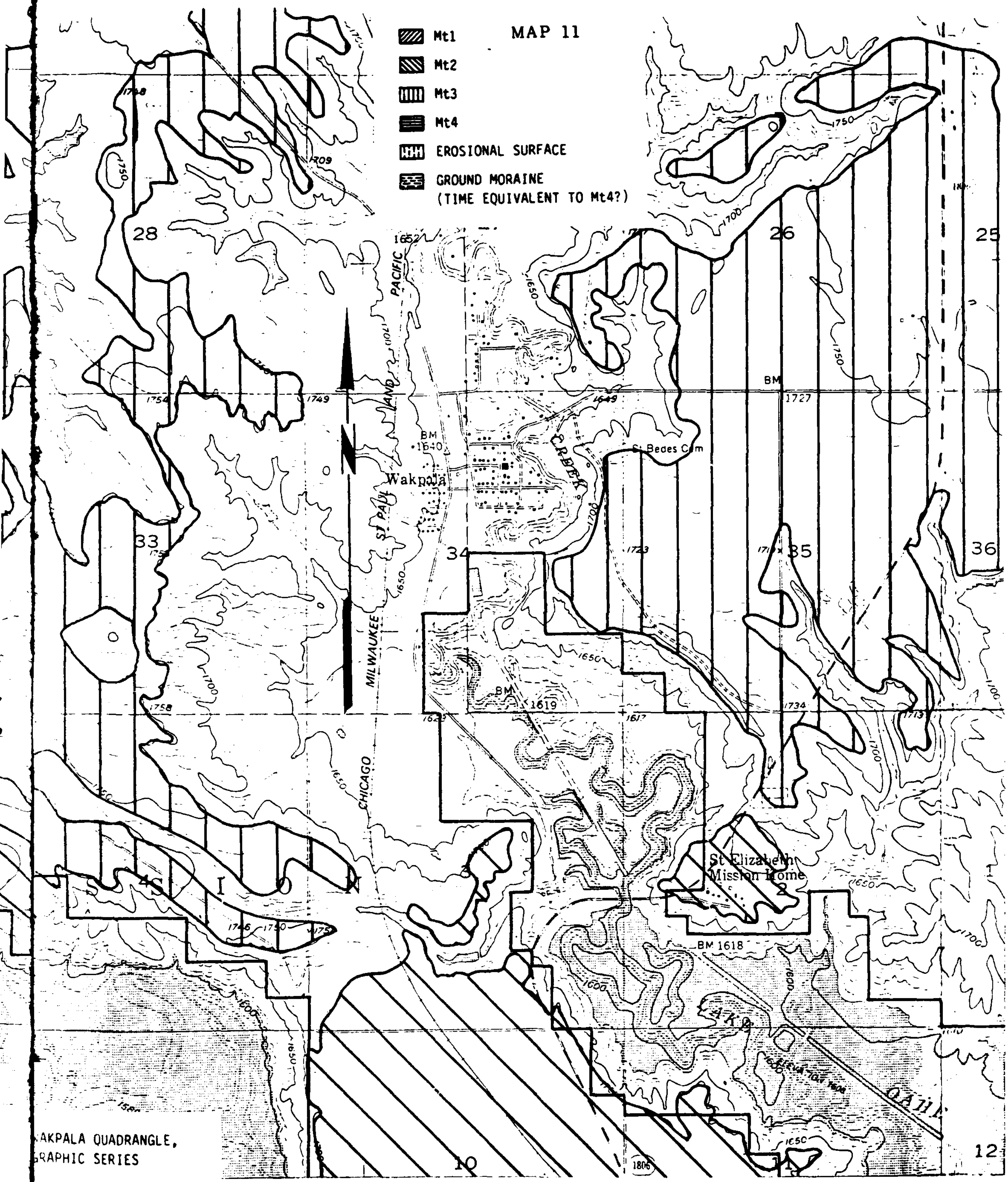
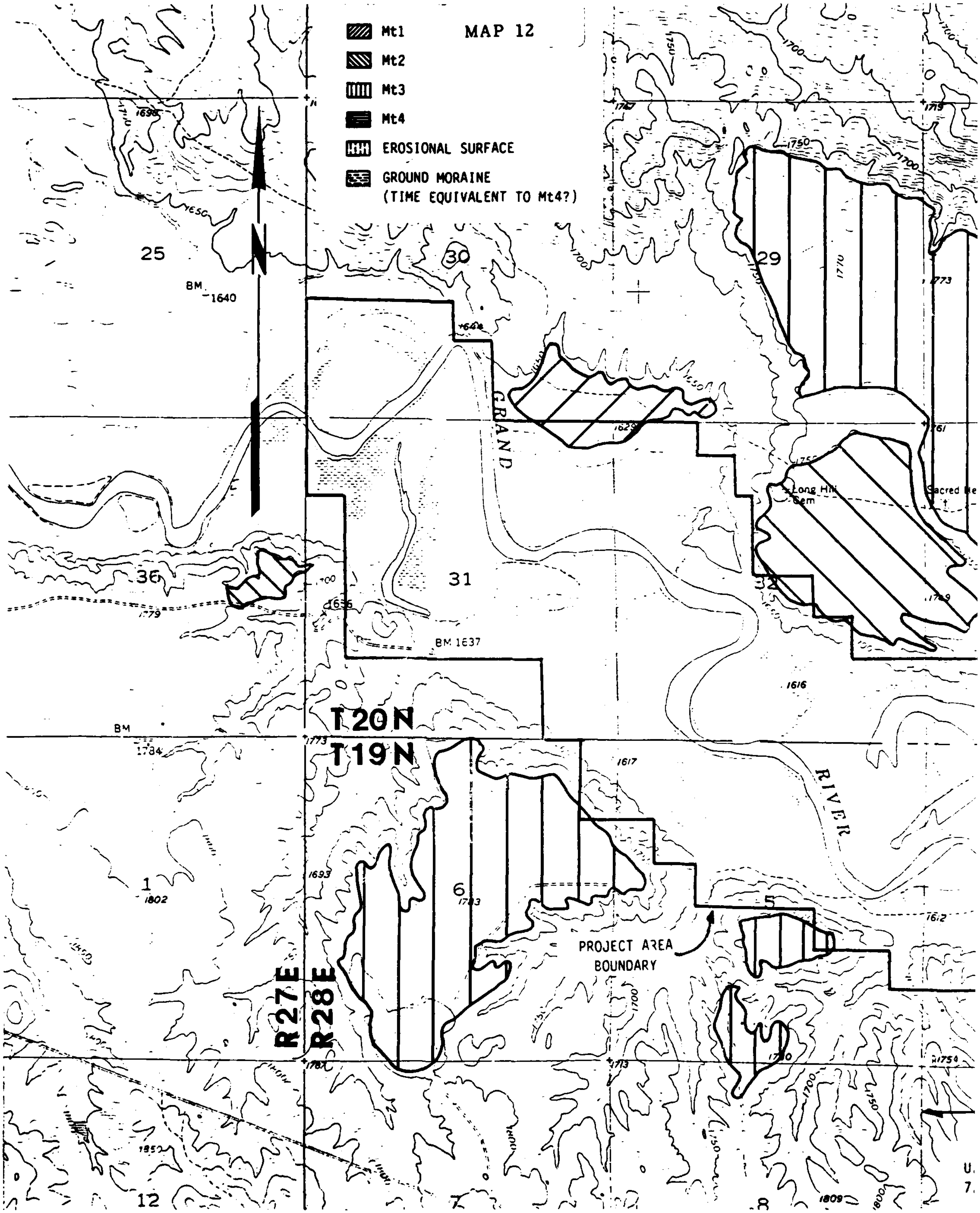
32
5
6
12
7
8
LAKE
GRAND
OAHE
PROJECT AREA BOUNDARY
Deep
Bank
Creek
ONE MILE
U.S.G.S. WAKPALA QUADRA
7.5' TOPOGRAPHIC SERIES


MAP 11
Mt1
Mt2
Mt3
Mt4
EROSIONAL SURFACE
GROUND MORAINE
(TIME EQUIVALENT TO Mt4?)
28
26
25
33
34
35
36
10
12
Wakpala
St Bedes Cem
St Elizabeth Mission Home
BM 1618
CHICAGO
MILWAUKEE
ST PAUL
AND
PACIFIC
OAHE
LAKE
AKPALA QUADRANGLE,
RAPHIC SERIES


MAP 12
Mt1
Mt2
Mt3
Mt4
EROSIONAL SURFACE
GROUND MORAINE
(TIME EQUIVALENT TO Mt4?)
25
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36
31
32
1
6
5
12
7
8
BM 1640
BM 1637
BM
1616
1617
1612
1802
1783
1693
1656
1779
1784
1773
1761
1852
1809
1750
1700
1710
GRAND
RIVER
Long Hill Cem
Sacred He
T20N
T19N
R27E
R28E
PROJECT AREA
BOUNDARY

U.S.G.S. WAKPALA NW QUADRANGLE,
7.5' TOPOGRAPHIC SERIES